

## **BAR CODED BILL PAYMENT SYSTEM AND METHOD**

2 This application is a continuation-in-part application under 37 C.F.R. § 1.53(b) of  
3 application Serial No. 09/737,011, filed December 14, 2000.

## BACKGROUND OF THE INVENTION

5 The present invention relates to a system and method for performing financial  
6 transactions, and more particularly, to a payment system and method using bar code  
7 identification.

## Traditional Bill Payment Paradigm

9 The current paradigm of the bill payment cycle for goods and services rendered  
10 has improved only in incremental steps since the beginning of time. In ancient times,  
11 most goods and services were exchanged between individuals, using the common  
12 currency of the realm or by a mutually agreed upon barter arrangement. Extension of  
13 credit for goods and services was generally limited to the affluent and wealthy. When  
14 payment was due, handwritten invoices were hand delivered. Sometime later, cash  
15 payment would be remitted in person. Most trade occurred at the local level between  
16 individuals, exchanging cash or barter goods.

17 In the late 1800's and early 1900's in the United States, credit for goods and  
18 services rendered remained essentially unchanged at the local level. Society became less  
19 stratified and there became an affluent middle class populace between the highest and  
20 lowest levels of society. Credit for goods and services became extended to select groups  
21 and individuals within this populace as well as the affluent and wealthy. However,  
22 invoices were still handwritten tallies of goods and services rendered, which were paid  
23 for in cash. The Industrial Revolution precipitated many technology advances in

1 transportation and communication, which affected many facets of daily life. In  
2 commerce, the foundation cornerstones of the financial services industry, as it exists  
3 today, were developed and shaped. With an infrastructure of a national mail network and  
4 a solid central banking system in place, the more affluent and wealthy individuals began  
5 to have a larger and more convenient span of financial control with extended remote  
6 banking credit services. Merchants could then send their invoices to distant customers  
7 through the national mail network and receive payments, some time later, in the form of a  
8 bank draft honored by the local bank for cash.

9 In the generations following World War II to the present time, with general  
10 society becoming more and more homogenized and, on the whole more affluent, banking  
11 services are available and competitive at every level. Bank checking accounts (and  
12 therefore a credit mechanism with which to pay remote billers) are available to 60 percent  
13 or more of the population. The national mail network is a very cost-effective delivery  
14 system for local and remote customers of automated or machine printed monthly invoice  
15 statements, which average 15.9 billion annually. Customers write checks, as payment for  
16 these invoices, and return them via the mail network. When received at the merchant  
17 directed return location (a bill payment-processing center), these mail payments are  
18 opened, the checks deposited, and the customer accounts credited with the face amount of  
19 these check payments.

20 If everyone were to pay their bills on or before the due date with valid checks, this  
21 state of the bill payment industry might be sufficient to satisfy most of today's societal  
22 needs. However, this is not the case. Some people never pay their bills on time, for a  
23 variety of reasons. Payments made with a check are not always covered with sufficient

1 funds at their bank. The end-result consequence to the biller is a finite cost that is  
2 directly attributable to the disruption of the flow of goods and services through his  
3 business.

4 To cover the costs incurred by these late payments, billers have only two options  
5 available to them. One option is to spread this overhead cost over of all the goods and  
6 services that they provide, with the possible consequence of pricing their products or  
7 services out of the competitive price range for similar or substitute set of products and  
8 services. The second option is to impose payment penalties on those customers who pay  
9 late – for whatever reason. This second option is generally more preferable since it  
10 targets the problem population segment directly. However, billers are often unable to  
11 recover the full cost of late payment consequences from those customers and still stay  
12 within the public legal and regulatory mandates.

13 Recently, there have been business attempts to further automate the bill payment  
14 process by the electronic delivery of biller invoices and the subsequent electronic  
15 remittance of payments. While the electronic presentment of bill payments might address  
16 the current 15% or so of the U.S. population with access to the Internet, it does not  
17 address the 85% without Internet access. Within the next decade, the Internet wired  
18 segment of the population will not grow as fast as the current crop of “dot com”  
19 entrepreneurs hope or project in their “new” economy business plans. The latest statistics  
20 show that less than 3% of the American public may use on-line remittance services.

21 Federal statistics indicate that fully 30-40% of the U.S. population may be  
22 “unbanked”. The “unbanked” population operates solely within the cash economy  
23 without any formal banking level traceability. There are many reasons that people prefer

1 to operate in this economy, some of which are culturally related. Others prefer  
2 anonymity for quite specific reasons, such as illegal aliens avoiding detection and  
3 deportation by the INS or others hiding their sources of income from the IRS. Federal  
4 statistics also indicate that 30-40% of the adult U.S. population may have a working  
5 fourth grade education or less.

6 There may be a correlation between those people opting for the cash economy and  
7 the fact that many may not be able to maintain and balance a checkbook. Most people  
8 would rather admit to being "unbanked" rather than to being illiterate. The "unbanked"  
9 segment of the population has difficulty operating in a check-oriented society and paying  
10 their monthly bills to remote billers. At the local level, the proprietor-operated check  
11 cashing storefronts may service some of the needs of these individuals. Weekly  
12 paychecks are cashed for a transaction charge (mostly based on the face value of the  
13 check), and money orders are then bought, to be enclosed with mailed bill payments.  
14 When bill payments are long past their due date, these individuals may have to resort to  
15 more expensive electronic wire services to avoid service disconnects.

16 For the great majority of printed bill payment invoices that are distributed every  
17 month, each biller automates and optimizes its bill collection and remittance process to  
18 suit the requirements of its installed paper handling equipment and flavor of customer  
19 account numbering assignments and schemes. Bill remittance stub sizes and formats  
20 vary from postcards printed with dot matrix printers to full-page 8 1/2" by 11" sheets with  
21 laser printed invoice information on pre-printed forms. Each has a tear-off bill remittance  
22 stub portion that is then mailed back with a check payment. Account numbers on these  
23 bill remittance stubs appear in different (and sometime multiple) spatial positions,

1 formats and fonts. While still not universal, most billers have formatted their account  
2 numbers (and other customer related information) on bill remittance stubs in Optical  
3 Character Recognition (OCR) readable scan lines. Some of this information is printed  
4 twice on the bill remittance stub as a contingency that the paper bill remittance stub is  
5 shredded or mangled by the automation equipment. Human data entry of this customer  
6 account number information is the ultimate fallback mode for processing this payment.

7 Traditional Bill Payment Examples

8 Figure 1 shows an exemplary local gas company remittance stub 100 utilizing this  
9 manner of design. The biller in this example has assigned a numeric account number to  
10 each of his customers. As shown in Figure 1, the customer account number is printed  
11 three times, the human readable one 102 under the "Your Account Number" heading, and  
12 the other two 103, 104 printed twice in machine-readable form. Account number check  
13 digits 101 are used to validate the account number. Each digit in the account number is  
14 multiplied by a mathematical weight, and then all these products are added together.  
15 Dividing the total sum by 10 and complementing the remainder yields the check digit that  
16 is compared against the indicated digit. If the digits match, then the account number has  
17 been detected and read correctly. Check digits are employed to eliminate two types of  
18 common errors, physical digit read errors and transposition errors (when the customer  
19 account number is processed manually).

20 Figure 2 shows an exemplary remittance stub 200 from a local power company  
21 that assigns a combination of letters and digits to its customer base. There are two forms  
22 of the customer account number 201 that appear on the bill remittance stub. The first 201  
23 is designed to be human readable because it appears within a printed text box labeled

1     “Account Number”. The last digit in the Account Number box is the customer account  
2     number check digit. The second form of the customer account number 202 appears in  
3     machine-readable form and is embedded in the OCR scan line (underlined for  
4     illustration). The leading “4” digit is the customer account number check digit and the  
5     remainder of the underlined portion of the OCR line are the digits that can be mapped  
6     into the human readable “Account Number” form. The format of this machine-readable  
7     OCR scan line 202 is probably a confluence of many internal design decisions, based on  
8     several factors. From a human ergonomics perspective, a customer service representative  
9     of the power company, during a service call, would never ask a customer to recite his  
10    account number from a sequence of digits appearing within the machine-readable OCR  
11    line and expect a correct answer. The human readable form 201 of the customer account  
12    number is easier for a customer to recognize and to dictate over the telephone when  
13    requesting service changes to his account.

14           These two examples illustrate the primary uses of duplicate account information  
15    printed on a bill remittance stub – one for simplicity when verbally referring to a specific  
16    customer account and the second for the case that the automation process fails and  
17    customer account number payment information has to be entered manually.

18           Figure 3 shows an exemplary remittance stub 300 from a gas company, in which  
19    the biller automates part of the bill payment remittance process by including, on the bill  
20    remittance stub, company proprietary bar coded information 301 that does not appear to  
21    be related in any way to the printed customer account number. While the format of this  
22    bill remittance stub 300 may marginally advance that biller’s state-of-the-art bill  
23    collection and system processing with the use of newer and improved automation

1 equipment, it does not significantly decrease, in favor of the customer, the overall bill  
2 payment cycle. The great majority of the bill payment cycle time consists of non-  
3 deterministic time delays in the national mail network during the biller-to-customer and  
4 the payment-to-biller delivery paths. These random time delays, combined with very  
5 short biller dictated due dates and (possibly intentional) delayed processing times, always  
6 work to the detriment of the customer. As a result, some customers are assessed penalty  
7 payments, which are sometimes more profitable than the basic goods and services  
8 provided.

9 The system of bill payment invoicing, collection and remittance processing  
10 remains a fragmented industry because there are no common bill remittance stub format  
11 standards, no common customer account number representation standards, no common,  
12 expedient data and money delivery mechanisms to the biller, and no large bill remittance  
13 stub processing networks, in addition to payment cycle delays that always work to the  
14 detriment of the customer to favor the biller (with a correspondingly greater profit  
15 margin). By constructing a common set of standards from the current set of available  
16 technology components, a universal national bill payment network could be implemented  
17 that addresses the above list of industry problems, resulting in a positive economic impact  
18 to the business community at large. For such a set of standards to work, the cooperation  
19 of several large organizations would be required; however increases in raw profit and  
20 new business growth opportunities should induce such cooperation.

21 As shown in Figure 4, a system 400 consistent with the existing bill payment  
22 paradigm uses the national mail network and biller payment processing centers to convert  
23 physical paper into electronic data and bank credits. The current bill payment network is

1 a paper based network that primarily relies on the central banking system for processing  
2 customer remitted bank draft payments and the national mail network for customer  
3 invoice delivery and the return of mailed bill payments. In system 400, for all the goods  
4 and services rendered to a customer over a given billing period, the biller accounts  
5 receivable 401 accumulates a dollar total and generates a detailed machine printed  
6 invoice (which may take 4-5 days after account cut-off time to process) that is sent to the  
7 customer 403 via U.S. Mail 402. The customer (i.e. payee) 403 typically receives the  
8 invoice 2-3 days later (which time is variable, without any direct traceability from the  
9 perspective of either the biller or the customer).

10 Once the customer receives the invoice in the mail, the customer makes out a  
11 check payment or procures a money order 404 to remit with a mail payment, which  
12 occurs sometime later, depending on the availability of cash resources and other  
13 circumstances. The customer mails the payment via U.S. Mail 405 to the biller collection  
14 and processing center 406, where processing time may be 2-3 business days or more  
15 (which time is variable, without any direct traceability from the perspective of either the  
16 biller or the customer). At the bill payment processing center 406, the following  
17 operations are typically performed: opening all received mail; microfilming and/or  
18 otherwise recording all received payments; electronically reading and processing OCR  
19 bill remittance stub information; preparing all received check or money order payments  
20 for bank submission; and electronically remitting bill payment data, based on check  
21 payment verification. Processing time within the processing center 406 may be 2-3 days.

22 It should be noted that there may be sanctioned late payment penalties imposed on  
23 credit card payments, wherein a biller might gain an advantage by intentionally delaying

1 an on-time payment by a day or so, thereby causing an otherwise on-time payment to be  
2 considered late. For example, for a \$200 payment delayed by only one day, a \$25 late  
3 payment penalty might result in an equivalent Annual Percentage Rate (APR) interest  
4 rate of 150%, for little or no marginal cost to the biller. This overcharge, which may be  
5 difficult for the customer to trace later, may be compounded by another finance charge  
6 for the outstanding unpaid balance amount, made late by that intentional delay.

7 Payment data is next remitted electronically from the processing center 406 to the  
8 biller's bank 408, and processing and distribution of electronic payment data is typically  
9 done using the Federal Reserve Automated Clearing House (ACH) Network 407, which  
10 typically takes 6-9 hours. At the biller's bank 408, the electronic payment data is  
11 received from the ACH Network, stripped and reformatted according to biller specified  
12 formats, which may take 4-6 hours. Finally, the biller's accounts receivable 401 and/or  
13 customer service computer files are updated. Depending on the "legacy factor" of the  
14 biller's computer processing systems, this process can range anywhere from 2-3 hours to  
15 4-5 days.

16 Assuming zero latency on the part of the customer paying his bill, the cycle time  
17 between the customer account cut-off time and the time that the customer payment is  
18 applied to his account, using the above time estimates, may range from 13-18 days.  
19 Since there is usually some customer delay, the observed bill payment cycle time will be  
20 longer.

1    **SUMMARY OF THE INVENTION**

2                    Biller-Payor Aspects of the Present Invention

3            The present invention involves the transmission of payment information via one  
4    or more networks (e.g. the Internet and the Federal Reserve ACH Network) to billers of  
5    consumer goods and services. This payment information is captured using existing  
6    scanners in cash register systems at supermarkets, chain stores, or other retail outlets.

7            Retailers gain access to a valuable affinity draw because everyone has bills to pay  
8    regularly. Billers save millions of dollars in collection and processing expenses.

9            Consumers are provided a convenient way to pay any bill quickly and flawlessly for a  
10   nominal transaction fee (e.g. \$1.00 per bill).

11            A bill payment system and method consistent with the present invention relies on  
12   an additional ISO standard printed bar code on the biller invoice, which is then delivered  
13   to the customer via the national mail network. Thereafter, payment information and  
14   payment credits are returned to the biller electronically. With the proliferation of the  
15   Universal Product Codes (UPC) that are imprinted on every retail product today, an  
16   infrastructure for processing bar coded information is already in place. At supermarkets,  
17   bar code scanners at all the checkout aisles are used to register the sale of all items for  
18   inventory and pricing purposes. Bar coded bill payments would be just another  
19   commodity item to be paid for, accepted at retail. Upon receiving a bar coded payment  
20   invoice, the customer could go to any supermarket, chain store, post office, or other  
21   location which accepts this type of payment, to pay his bill. In return for the nominal  
22   transaction fee paid, a customer might receive a printed detailed proof of payment  
23   receipt. Billers could be notified immediately and agree to suspend all collection

1 activities, and account posting could take place within 36 hours, all funds remaining  
2 within the Federal Reserve Banking system. No state banking licensing would be  
3 required, since each biller's approval is secured by means of a biller registration process,  
4 which introduces the technical specifications and certification parameters necessary for  
5 billers to participate in a system consistent with the present invention.

6 As a participating retail establishment provides bill payment services to the  
7 public, it also forms a new portal. A proprietary router/application interface may be non-  
8 invasively attached, indirectly, to the retailer's checkout scanner. Through this portal,  
9 other services can be offered to consumers. For example, in addition to payments, money  
10 transfers (a financial services which may be lucrative to provide) may be provided  
11 through a system consistent with the invention. Bank account transactions such as  
12 deposits may be made or Internet wallets replenished. Though not required, the U.S.  
13 Postal Service (USPS) could be offered a new income stream for simply authorizing this  
14 system. The power of an "electronic" postmark may impact the way billers view this  
15 system.

16 It is contemplated that the retail industry should provide advertising as they  
17 promote the affinity pull they already wish to impart upon the consumer marketspace.  
18 The community of consumer billers should provide cooperation because of the potential  
19 of this system to reduce what are now very expensive embedded collection costs.  
20 Consumers need another way to pay their bills more efficiently than the U.S. Post Office  
21 mail can do so today, especially for those without bank accounts or those who desire to  
22 use credit for bill payments, and clearly for those who are late. A system consistent with

1 the present invention therefore benefits billers, consumers and retailers who participate,  
2 and may be inexpensively and easily established and maintained.

3 Further Payment Aspects of the Present Invention

4 A system and method for payment is further provided, wherein consumers pay  
5 their bills at supermarkets, large retail chain, or other stores and receive immediate credit  
6 from billers for their payments, which are made using a bar code transmitted  
7 electronically to the consumer, e.g., by fax, email, or Internet. The biller receives good  
8 payment funds, deposited directly into his bank account, and error-free electronic  
9 payment data for consumer bill payments by the very next business day. The biller  
10 backdates the received bill payments to the time and date the consumer actually paid,  
11 regardless of the time that the payment data takes to post to the biller's accounts  
12 receivable system.

13 In another aspect, a method for person-to-person money transfers is provided,  
14 wherein a bar coded deposit slip, card, or other printout permits a sender to remit funds  
15 directly into a receiver's bank account, and such funds are quickly accessible for  
16 withdrawal at a nearby automated teller machine, or for a debit card purchase.

17 In one aspect, a bill payment system consistent with the invention comprises a  
18 payee and a scanning apparatus. The payee transmits or transfers to at least one payor a  
19 unique bar code comprising data identifying at least the payee and the payor. The  
20 scanning apparatus is configured to scan a printed representation of the bar code . The  
21 scanning apparatus is capable, based on information stored in the bar code and a payment  
22 made by the payor, of transmitting funds or initiating a funds transfer to the payee in a

1 predetermined amount and transmitting data or initiating a data transfer to the payee  
2 regarding the payment.

3 In method form, a bill payment method consistent with the invention comprises:  
4 transmitting or transferring to at least one payor a unique bar code comprising data  
5 identifying at least the payee and the payor; and permitting a third party to scan a printed  
6 representation of the bar code and, based on the identifying information of the bar code  
7 and a payment made by the payor, to transmit funds or initiate a funds transfer to the  
8 payee in a predetermined amount and transmit data or initiate a data transfer to the payee  
9 regarding the payment.

10 In another aspect, a method of transferring money consistent with the invention  
11 comprises: scanning a printed bar code comprising data identifying at least an account  
12 number corresponding to an account to which a deposit can be made and a destination  
13 payment network corresponding to the account; and transmitting funds or initiating a  
14 funds transfer, based on information stored in the bar code and a payment made by a  
15 payor, in a predetermined amount to the account.

16 In a further aspect, a deposit slip consistent with the invention comprises a printed  
17 account number and a unique bar code comprising data identifying at least the account  
18 number and a destination payment network corresponding to the account number.

19 In still another aspect, a printed bar code consistent with the invention comprises  
20 data identifying at least an account number and a destination payment network  
21 corresponding to the account number.

22 In yet a further aspect, a method for performing an Internet financial transaction  
23 consistent with the invention comprises transmitting or transferring to a payor a unique

1 bar code comprising data identifying at least a payee and a destination payment network  
2 corresponding to the payee.

3 In still a further aspect, a method of providing for payment from a payor to a  
4 payee comprises: making available to one or more payees a standard format for  
5 representing on a printed document data including at least a payee and a destination  
6 payment network corresponding to said payee; providing at one or more locations of one  
7 or more third parties one or more scanning apparatus adapted to read data in said standard  
8 format; receiving by electronic transmission data comprising said destination payment  
9 network identification, payee identification and payment amount; and providing  
10 information to said destination payment network to effect transmission of funds to an  
11 account of said payee in an amount identified by said payment amount and concurrently  
12 effecting or initiating transmission of payment information to said payee.

#### 13 **BRIEF DESCRIPTION OF THE DRAWINGS**

14 Figure 1 is an exemplary prior art remittance stub from a utility company;  
15 Figure 2 is another exemplary prior art remittance stub from a utility company;  
16 Figure 3 is another exemplary prior art remittance stub from a utility company;  
17 Figure 4 is a process flow diagram of an exemplary prior art bill payment system;  
18 Figure 5 is a process flow diagram of an exemplary bill payment system  
19 consistent with the present invention;  
20 Figure 6 is an illustration of an exemplary data structure of elements underlying  
21 the bar code "signature" in one embodiment of the present invention;  
22 Figure 7 is an illustration of another exemplary data structure of elements  
23 underlying the bar code "signature" in one embodiment of the present invention;

1       Figure 8 is an illustration of an exemplary bar code bill payment "signature" in  
2       one embodiment of the present invention;

3       Figure 9 is a table illustrating the results of an exemplary split modulus matching  
4       calculation in one embodiment of the present invention;

5       Figures 10 and 11 are illustrations of an exemplary Level 3 envelope in one  
6       embodiment of the present invention;

7       Figures 12 and 13 are process flow interaction diagrams of the mainline  
8       transaction information interchange between the checkout scanner, retailer host  
9       processor, and data collection network interface (DCNI) unit in processing a bar coded  
10      customer bill remittance stub, in one embodiment of the invention;

11       Figure 14 is a system view diagram of a transaction collection system in one  
12      embodiment of the present invention;

13       Figure 15 is an exemplary transaction processor executive controller (TPEC)  
14      display screen, in one embodiment of the invention;

15       Figure 16 is an exemplary system monitor station (SMS) display screen, in one  
16      embodiment of the invention;

17       Figure 17 is an exemplary end of batch monitor (EBM) display screen, in one  
18      embodiment of the invention;

19       Figure 18 is an exemplary electronic transmission interface (ETI) display screen,  
20      in one embodiment of the invention;

21       Figure 19 is an exemplary ETI transaction detail display screen, in one  
22      embodiment of the invention;

1       Figure 20 is an exemplary ETI map biller-to-partner display screen, in one  
2 embodiment of the invention;

3       Figure 21 is an exemplary transaction browser display, in one embodiment of the  
4 invention;

5       Figure 22 is a process flow diagram of another exemplary bill payment system  
6 consistent with the present invention;

7       Figure 23 is an illustration of an exemplary Level 3 envelope in one embodiment  
8 of the present invention;

9       Figure 24 is an exemplary bar coded deposit slip in one embodiment of the  
10 present invention;

11       Figure 25 is an illustration of an exemplary gas station/convenience store debit  
12 card known in the art; and

13       Figure 26 is an illustration of an exemplary gas station/convenience store debit  
14 card in one embodiment of the present invention.

15       **DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

16                    Biller-Payor Embodiments

17       Turning now to Figure 5, a bar coded bill payment based system 500 consistent  
18 with the present invention utilizes a bar code on the biller invoice, which is then delivered  
19 to the customer via mail, and payment information and payment credits are returned to  
20 the biller electronically. Advantageously, nationally recognized and federally sanctioned  
21 payment electronic networks may be utilized for remitting customer payment data and  
22 funds. For all the goods and services rendered to a customer over a given billing period,  
23 the biller's accounts receivable 501 accumulates a dollar total and generates a detailed

1 machine printed invoice including a special bar code, which is mailed to the customer  
2 503 via U.S. Mail 502. Time for processing and mailing may be 4-5 days after account  
3 cut-off time, and the mail transit time to the customer may add an additional 2-3 business  
4 days or more before the customer receives the invoice (which time is variable, without  
5 any direct traceability from the perspective of either the biller or the customer). The  
6 customer 503 then receives the invoice in the mail. Sometime later when cash resources  
7 are available, or depending on other factors, the customer 503 decides to pay bill. The  
8 time for this to occur is variable, depending upon the customer's circumstances.

9 To pay the bill, the customer 503 takes the bar-coded invoice to a participating  
10 store (e.g. a supermarket) that processes bill payments. The customer presents his bar-  
11 coded bill remittance stub to the checkout cashier for scanning at the checkout scanner  
12 504, which may be done while paying for other UPC-coded items. Instead of looking up  
13 an in-house UPC code for pricing, the scanner 504 picks up the bill payment bar code  
14 that identifies the biller to be paid and the account number to be credited. The customer  
15 informs the checkout cashier the amount to be paid on that account, payment is tendered  
16 to the cashier, and the cashier inputs the amount to be paid into a terminal which is in  
17 communication with a backend host processing system 505. Upon receiving payment  
18 from the customer, that bill payment is then complete. The check out of any remaining  
19 products and items (or bills) continues until the complete total for all goods and services  
20 is calculated. The customer may receive a printed receipt of the payment tendered with  
21 date and time that the payment was made. The backend host processing system 505  
22 forwards all the payment data to the data collection network interface 506 ("DCNI").  
23 The processing time for all of the payment steps may be as little as a few seconds.

1 Moreover, payments made in this manner are time-stamped, so that once payment is  
2 made, the customer may rest assured that payment has been timely acknowledged.

3 The data collection network interface 506 collects and stores all the customer  
4 payment data in non-volatile memory. Periodically throughout the day (based on time  
5 and transaction volume thresholds), or at other predetermined intervals, the interface 506  
6 transmits the payment data to the central site transaction collection system 507.

7 Additional transmissions may be scheduled before the daily transaction collection system  
8 507 aggregation times. The time for the back-end and collection system processing has  
9 no impact on customer payment time, since all payments may be time-stamped.

10 Separately calculated calendar day payment counts and totals may also be sent to the  
11 transaction collection system 507 as an independent transaction audit balancing  
12 mechanism. The transaction collection system 507 may continuously receive payment  
13 data information from a distributed network comprising a plurality of data collection  
14 network interface units 506 deployed at field retail establishments. Before the last  
15 processing window closes at the Federal Reserve Automated Clearing House (ACH)  
16 Network 508, all customer payments are sorted and aggregated for direct remission to  
17 their respective billers, which may take approximately an hour. Processing and  
18 distribution of electronic payment data is done using the Federal Reserve Automated  
19 Clearing House (ACH) Network 508, which may take 6-9 hours. At the biller's bank  
20 509, the electronic payment data is received from the ACH Network, stripped and  
21 reformatted according to biller specified formats, which may take 4-6 hours. Finally, the  
22 biller's accounts receivable 501 and/or customer service computer files are updated.

1     Depending on the “legacy factor” of the biller’s computer processing systems, this  
2     process can range anywhere from 2-3 hours to 4-5 days.

3             Assuming zero latency on the part of the customer paying his bill, the cycle time  
4     between the customer account cut-off time and the time that the customer payment is  
5     applied to his account, using the above time estimates, may range from 9-12 days (in  
6     contrast to the 13-18 days of the prior art system). Since there is usually some customer  
7     delay, the observed bill payment cycle time will be longer.

8             Moreover, if the biller recognized the customer payment date and time as the  
9     creditor date of receipt as specified in the Federal Reserve Regulation Z, Section 226.10,  
10    then the total bill payment cycle time would be reduced to 6-8 days. Explicit agreement  
11    from the biller would be secured through the biller registration process. The biller may  
12    validate the customer payment date with the transaction embedded “electronic postmark”,  
13    which can not be performed within the current frameworks of either the paper based bill  
14    payment or the electronic payment paradigms, today.

15             In addition to the more than 55% time reduction in the bill payment cycle, other  
16    advantages of the present invention include: customer choice of local bill payment  
17    locations, electronic application of bill payments to account within 24-36 hours, a  
18    reduction in bill payment errors with machine-readable bar coded account numbers, and  
19    time stamping of bill payments at the time payment is tendered. Electronically delivered  
20    bill payments, under the present invention, are much cheaper for the customer to pay for  
21    and less expensive for the biller to process through its remittance processing center and  
22    accounts receivable systems than under a prior art system. Additionally, banks that  
23    process data from the ACH system will have more chargeable services to offer their biller

1 customers. Furthermore, billers can incorporate this bar coding standard into their bill  
2 remittance processing centers, as older OCR recognition equipment is replaced with  
3 simpler and more reliable laser bar code scanning equipment. With sufficient planning, a  
4 biller, contemplating a conversion of one or more legacy customer account numbering  
5 systems to a simpler, newer scheme, can use this system of bar coding in its conversion  
6 process. In an alternative embodiment, electronic invoice delivery, whereby the customer  
7 receives and prints the bar-coded invoice at his own computer system, may be used to  
8 reduce the time and labor required for the biller to prepare and mail invoices to the  
9 customer.

10 It is further contemplated that billers would register with a centralized  
11 organization in order to receive an assigned biller bar code, just as all companies must  
12 register with the Uniform Code Council (UCC) to get their Universal Product Code  
13 (UPC) assignment for their products.

14 It should be understood that the foregoing described embodiment which uses the  
15 in-store scanner and retail host back-end machine as a means of detecting, reading and  
16 processing the bill payment bar codes is but one embodiment, and these components are  
17 not described herein as limitations. For example, another method might utilize a personal  
18 computer, terminal, or other equipment having a bar code capable scanner, receipt printer  
19 and an interface to the data collection network interface in place of the in-store system.  
20 Ideally, such a computer would have the same functionally equivalent interface as the in-  
21 store system. In fact, it is contemplated that, as a transitional measure, until the retail  
22 stores modify or update their in-house check-out software systems to accommodate the

1 data collection network interface, a simple PC might operate in its place and serve as a  
2 model prototype to demonstrate the operational aspects of this system.

3 Bar Coding Validation

4 Prior art systems have concentrated on the visual aspects of bill remittance stub  
5 recognition, detection and validation against potential fraud, typically using optical  
6 character recognition (OCR). The present invention applies a bar code solution to the  
7 general bill payments problem, rather than a new variant or improved OCR technique.  
8 Bar code is more efficient than OCR by several magnitudes because bar codes can be  
9 detected reliably and processed by relatively simple hardware and firmware, whereas  
10 OCR requires long physical scan times and significant host CPU processing requirements  
11 for character recognition (and then only for a selected set of fonts). Bar code consists of  
12 binary elements that are parity checked for every bar code symbol and globally checked  
13 digitized at the message level. OCR consists of many analog segments that have to be  
14 neurally correlated and matched to the human readable character set with no internal self-  
15 checking controls. In short, bar code is the future digital solution whereas OCR is a dated  
16 analog solution that still plagues most bill payment processes today.

17 The Universal Product Code (UPC), printed on most retail products today, is a 12-  
18 digit number that is a concatenation of four numeric fields - a classification number (1), a  
19 producer identification number (5), a product identification number (5), and a check digit  
20 (1). The need for a standards authority first arose in 1972 when the supermarket industry  
21 decided to mark each of the grocery point-of-sale packages with a unique identifier to  
22 speed checkout transactions, therein creating an organization that today is called the  
23 Uniform Code Council (UCC). The underlying bar code symbology is merely a

1   convenient representation of this UPC code format that can be reliably detected by simple  
2   point-of-sale scanning equipment (thus, it does not matter which particular bar code is  
3   used).

4           There is no standard way of representing multiple data fields in a single scan line,  
5   given the designs and formats of various bar code standards and conventions commonly  
6   in use today. For a typical bill payment application, two fields are minimally required - a  
7   6-7 digit biller identification and a variable length (up to 22 characters or more)  
8   alphanumeric customer account number. If these fields were concatenated in a fixed  
9   format in a single bar code scan line on a bill head, it is very doubtful that low skilled  
10   retail help would reliably scan the correct bar code where multiple bar codes might  
11   appear on a given bill head. To perform error-free data validation on this scan line, more  
12   information must be embedded within the data itself.

13           In the retail environment where bar coded products abound, there is a distinct  
14   need to determine that a bar code, submitted for processing, is correct and valid for the  
15   target bill payment processing application. One cannot assume that the retailer will  
16   always submit a valid bar code from a bill remittance stub that may contain more than  
17   one printed bar code sequence. If, for example, a utility company prints the new bill  
18   payment bar code, in addition to an already existing internal routing bar code, the two bar  
19   codes must be disambiguated. While the utility company can easily distinguish its own  
20   internal routing code by its printed position on the bill remittance stub, a retail cashier  
21   might not know which to present. The solution is for the cashier to use trial and error. If  
22   the first bar code attempted does not validate, the second (or third, etc.) should be

1 scanned. Validating a bar code bill payment “signature” in the course of the bill payment  
2 process is a component of an embodiment of the present invention.

3 By using a unique bar code “signature” having multiple levels of data validation  
4 implemented by check digit algorithms, a bar code scanning system may reliably  
5 recognize and validate a valid bill payment bar code. The concept of paper envelopes  
6 may be used as an analogy for relating the validation method of the invention. In the  
7 embodiment described herein, three “envelopes” are used (although those skilled in the  
8 art will recognize that any number of “envelopes” or levels of validation may be used),  
9 the first being inside the second, and the second inside the third. At the outermost layer,  
10 the third “envelope” has printed, on the outside, the bill payment bar code “signature”. If  
11 the bar code is detected and read correctly by the hardware scanner, the resulting  
12 alphanumeric information is valid in that it compared correctly with the embedded  
13 encoded bar code check symbol. If this first operation is successful, the “envelope” is  
14 opened. The directions printed on the inner “envelope” specify to calculate a check digit  
15 on the resulting alphanumeric information derived from the bar code, comparing the  
16 calculated result against the last digit in the string. If this second operation is successful,  
17 the next “envelope” is opened. The printed directions on the innermost “envelope”  
18 specify to use the format designator digit(s) to decode and to verify the data integrity of  
19 the embedded component data elements. Each of these data elements should be verified  
20 by calculating their check digits and by utilizing other independently available data  
21 validation checks.

22 If all three levels of validation successfully pass muster, then a valid bill payment  
23 “signature” has been detected and the resulting data should then be passed to the target

1 bill payment application for subsequent processing. Failure at any intermediate  
2 validation level results in a negative acknowledgement. The prime purpose of this bar  
3 code “signature” design is to unconditionally identify the detected scanned bar code as  
4 being proprietary to the present invention, in the absence of any other external  
5 information, through multiple layers of check digit information, format designator  
6 indicators and local data validation schemes.

7 A number of different application “signature” formats may be implemented  
8 within a bar code scan line as a series of successive embedded “signature” data fields. In  
9 one embodiment, each signature data field consists of three elements: a format designator  
10 (“fd”) consisting of one or more digits, a data field (“data”) consisting of one or more  
11 fixed or variable length sub-data fields, and a check digit (“cd”) algorithm associated  
12 with the format designator and the level at which it appears.

13 Figure 6 illustrates a bar code “signature” 600 in one embodiment of the  
14 invention, utilizing four levels of successive embedded “signature” data fields. The  
15 Level 1 data validation 601 is simply the hardware decode of the bar code symbology,  
16 using the embedded check symbol character as data validation – i.e., all the bar code  
17 symbols were detected and processed correctly. Applicability of the data to the intended  
18 target application is demonstrated when all the remaining levels of validation are  
19 successful. As shown in Figure 6, Level 2 data validation 602 consists of one signature  
20 data field (although it could have had more). The data validation of the Level 2 signature  
21 data field consists of two checks – that the format designator value (for that level) is  
22 correct and that the check digit calculation for the data string consisting of the format  
23 designator digit(s) and the data field digits matches the check digit character. The Level

1 2 format designator defines at least three characteristics: the check digit algorithm  
2 implementations (in this example, 1), the number of data elements (in this example, 1),  
3 and the number of trailing discard characters for bar code odd / even count padding (in  
4 this example, 2). The number of unique combinations of the above three characteristics  
5 will determine the number of format designator values required at this level. For this  
6 example, there is only one check digit algorithm to disambiguate target applications,  
7 there is only one data field element, and there are two padding character combinations for  
8 the Code 128 bar code. Thus, the total number of format designator values required at  
9 this level is two.

10 The Level 3 signature data field 603 checks operate on the residual Level 2 data.  
11 The Level 3 data validation checks are similar to the Level 2 checks and the format  
12 designator defines at least these three characteristics: the check digit algorithm  
13 implementations (in this example, 1), the number of data elements (in this example, one  
14 fixed, one variable or fixed), and the field lengths for one or more data elements. As  
15 shown in Figure 6, there are two data element fields. The number of data splits defined  
16 for this data field would determine the number of format designator values that are  
17 required for this level.

18 The fourth 604 to nth 605 levels comprise a continuing iterative process of Level  
19 3. Depending on the attributes or properties that one arbitrarily assigns to the data (and  
20 hierarchical functions) at each level determines the number of format designator values  
21 required at that level. The target application receives all the data fields from the final  
22 level of data validation.

1       A carefully chosen set of conventions for the format designators at each level will  
2    facilitate correct data field parsing with the additional security that multiple levels of  
3    check digit validation will ensure data integrity and “positive ownership” to the target  
4    application. The format designator digit(s) do not necessarily have to be leading as  
5    illustrated above. An alternative format for the leading format designators could be as is  
6    illustrated in the bar code signature 700 of Figure 7, in which the data strings precede the  
7    format designator digits.

8       With reference to the exemplary embodiment shown in Figure 6, a sample format  
9    of the unique bar code bill payment “signature” 800 is shown in Figure 8, as a multiple  
10   layered data validation scheme. A bar code typically consists of 6 sections: (1) a quiet  
11   zone (~ 0.25” of white space) before the bar code; (2) a unique bar code symbol that  
12   represents the “START” character; (3) bar code symbols representing data characters  
13   (1300017350764058410363); (4) bar code check symbol that represents a calculated  
14   check digit of the preceding data character block; (5) a unique bar code symbol the  
15   represents the “STOP” character; and (6) a quiet zone (~ 0.25” of white space) after the  
16   bar code. If the hardware decode of this Level 1 envelope data string is not successful,  
17   the retail cashier should not get a good bar code scan confirmation. If the hardware  
18   decode is successful, the retailer cashier should get a good bar code confirmation (but not  
19   necessarily of a valid product code). A good hardware decode of a bar coded scan line is  
20   defined as the detection of valid bar code symbols within the string that, when processed  
21   through the defined check digit algorithm, matches the embedded string check symbol  
22   character. This is the first level of data validation check that must pass.

1        When the bar coded data characters are decoded from this scheme of variable  
2        width white and dark bar patterns, the result is the following string of (alpha)numeric  
3        characters: 130001735076405841036 3. Calculating a split modulus 10 check digit for  
4        the string to match against the last character, using a 1313... mathematical weighting  
5        scheme, results in the table of calculations illustrated in Figure 9. The Level 2 format  
6        designator value (1) is chosen to indicate the check digit algorithm (Split Modulus 10  
7        with mathematical weights of 1313...), the number of data field elements (1), and  
8        number of trailing padding characters (0) to utilize the high density Code 128 Type C  
9        symbol set. The Level 2 format designator value (2) is chosen to indicate the check digit  
10       algorithm (Split Modulus 10 with mathematical weights of 1313...), the number of data  
11       field elements (1), and number of trailing padding characters (1) to utilize the high  
12       density Code 128 Type C symbol set. The modulus (or the remainder) of the resulting  
13       sum of the digits (87 divided by 10) yields 7. The complement of the remainder 7 yields  
14       3 (10-7=3). This calculated result is the check digit of the above digit string, and  
15       successfully matches the last digit in this illustrative example. This is the second level of  
16       data validation check that must pass. If this validation is successful, the operation  
17       proceeds to the Level 3 envelope data decode and validation algorithms.

18       In this particular example, there are only three levels of validation defined. The  
19       Level 1 check is a hardware validation data check. The Level 2 check is a pre-qualifying  
20       software validation data check. The Level 3 check is an “ownership” data check (i.e.  
21       whether this is the “signature” for bill payment data under the present invention).  
22       Different “signatures” can be constructed for any number of application program uses  
23       through a judicious design scheme and the selection of format designators. Format

1 designators are arbitrary indicators with which to properly decode the format of and to  
2 validate the ensuing data string – in this case, the format designator is placed as the first  
3 (one or more) leading digit(s). At different levels, the same format designator values can  
4 have different meanings.

5 Turning now to Figures 10 and 11, two format designator values have been  
6 chosen in this example (at Level 3) to encapsulate six format and validation data  
7 characteristics – all of which must be correct for the third and final data validation check  
8 to pass. The Biller ID in each of these examples is “173” in a 6-digit numbering system.  
9 The embedded spaces in the encoded data examples 1000 and 1100 of Figures 10 and 11  
10 are not significant and are inserted to show more clearly the various fields within the  
11 example digit strings. The six format designator characteristics shown in Figures 10 and  
12 11 define either format (1,2,4,5) or data validation (1,2,3,6) checks. A format  
13 characteristic defines the layout of the data whereas a validation characteristic facilitates  
14 data checking. To validate a unique bar code application program “signature”, the more  
15 dependencies that exist within the data at each level for subsequent cross checking and  
16 validation, the better. In the illustrations of Figures 10 and 11, there are two format  
17 designator examples with all possible variants within several constraints that are checked  
18 and validated. Where there might be several different Level 2 check digit algorithms  
19 employed, a Level 3 dependency is checked. Condition #1 is checked against valid range  
20 of format designator values for the current Level (in this case 3, 4). Biller Identification  
21 Number (in this example, 173) is determined if Condition #3 is TRUE and if it exists  
22 within the list of current and valid billers (an independent table acquired by another  
23 means). Where the biller account number check digit algorithms are not known, a check

1 digit is calculated and added to the account number – to be checked then stripped when  
2 presented to the biller (Format Designator Value = 4). Where the biller account number  
3 check digit algorithm is known, it is checked against biller defined specifications (Format  
4 Designator Value = 3): Conditions #1, #6. Within the Level 3 envelope for each of the  
5 above examples, the decoded and check digit values of the Biller Identification  
6 Number and the presented Biller Customer Account Number results are as follows: For  
7 Format Designator Value = 3, Biller ID = 173, Customer Account = 07640584103; and  
8 for Format Designator Value = 4, Biller ID = 173, Customer Account = 0764058410.  
9 This is the third level of data validation check that must pass. If all the components in the  
10 Level 3 envelope test and compare successfully, then the unique bar code bill payment  
11 “signature” has been correctly validated for further processing, and an indication is given  
12 to the retailer or cashier that a dollar amount payment should be entered for this item.

13 The primary purpose of this bar code “signature” design is to unconditionally  
14 identify the detected scanned bar code as being proprietary to a system or method  
15 according to the present invention, in the absence of any other external information, and  
16 to validate (using mathematical formulae and/or independent table look-up methods, if  
17 possible) all the data element components therein.

18 The methods and procedures by which the format designator concept could be  
19 extended are strictly an implementation issue of design schemes and an adopted set of  
20 orthogonal convention(s). While the foregoing illustrative working example uses only  
21 three levels of “envelopes” to validate the unique bar code bill payment “signature”, more  
22 levels could have been used, as required. The format designators in the foregoing  
23 example utilized a fixed data format with a set of predefined check digit algorithms for

1 each level. Possible design extensions in further embodiments might include: (1) a  
2 format designator design scheme that defines a dynamic variable number of sub-field  
3 elements and/or a set of dynamic component string lengths for each of the defined set of  
4 the sub-field elements (in contrast to the foregoing illustrated predefined fixed schemes);  
5 (2) a format designator design scheme having more than one digit in length, wherein each  
6 digit specifies an independent set of predefined orthogonal attributes that can be  
7 combined in a mix-and-match fashion (e.g. a two digit format designator would specify a  
8 primary set of attributes in the tens digit that is qualified by a secondary set of attributes  
9 in the units digit); and (3) format designator design schemes wherein subsequent trees of  
10 sub-field elements are controlled by one or more preceding levels of format designators.

11 Bar Coding Specifications

12 The bill payment application bar code printed on each bill remittance stub might  
13 minimally consist of four basic fields, printed as a single string of digits: a format  
14 designator (1 digit); a biller identification number with optional embedded check digit (7  
15 digits); a customer account number with optional embedded check digit (22 digits); and a  
16 check digit of the previous three fields (1 digit). Of course, those skilled in the art will  
17 recognize that the number of fields and/or digits per field as described herein is specified  
18 by way of example, and not limitation, and that the number and length of fields may vary  
19 according to each embodiment of the invention. In this example, the outermost bar code  
20 envelope for this information conforms to documented ISO bar coding convention  
21 standards, utilizing an embedded check digit algorithm to verify the integrity of the entire  
22 bar code scan line data. It is strongly recommended that the biller defined customer  
23 account number also contain an embedded check digit, as a prudent secondary validation

1 measure. If an embedded check digit does not already exist within the biller customer  
2 account numbering scheme (or the biller does not wish to disclose that information as  
3 being company proprietary), an alternate account number format provides a temporary  
4 check digit that is checked then discarded before presentation to the biller. If the detected  
5 bar code scan line data correctly passes the triple tiered and multiple embedded check  
6 digit calculations, this mechanism will virtually guarantee “defect free” biller and  
7 customer account data. Otherwise, a bill payment stub whose bar code has been  
8 mutilated or defaced by the customer is immediately rejected at the point-of-sale entry.

9 To accommodate future requirements, an expanded set of format designators  
10 could define new data format structures or redefine the characteristics of current data  
11 fields. The following is a possible list of characteristics that a format designator element  
12 might define within a digit string: number of sub-field elements; component string  
13 lengths of one or more of these sub-field elements; check digit algorithms to be applied to  
14 each of the sub-field elements; odd/even string packing factors when a single bar code  
15 character represents one or more digits (Code 128 is a good example of this compression  
16 feature); or subsequent trees of dependent sub-field elements. These format changes  
17 would be transparent to the end user. The bar code data, detected by the retail checkout  
18 scanner, is passed directly to the data collection network interface unit for secondary  
19 validation and translation. The parsed “translated” form of this data is then passed back  
20 to the back-end host processor system for completing the bill payment transaction at the  
21 checkout counter.

22 The bar code might either be printed vertically on the left (bottom to top) or right  
23 (top to bottom) hand side of the bill remittance stub with sufficient surrounding white

1 space to satisfy the criteria of the ISO bar code format. If there are other proprietary bar  
2 codes present on the bill remittance stub, the checkout counter cashier could have the  
3 option of folding or bending the bill remittance stub such that only the required bar code  
4 is visible for a successful bar code scan of the bill payment information. Vertically  
5 printed bar codes of the format designator, biller identification number and the customer  
6 account number on most bill remittance stubs is good for a combined number sequence of  
7 14-25 digits at the lowest common denominator bar code print resolution (nominal bar  
8 code "X" dimension  $\geq 0.010$  inches and total bar code string length  $\leq 3.0$  inches). For  
9 sequences longer than that, it is recommended that the bar code sequence be printed in a  
10 manner parallel to the horizontal OCR line such that extraneous proprietary bar code  
11 information can be folded out of the way for a successful scan.

12 The assigned biller identification number is acquired or distributed from a central  
13 registry authority, akin to the manner in which the Uniform Code Council assigns new  
14 producer identification numbers. As far as the customer account number is concerned, it  
15 is recommended that the biller include a check digit within the account numbering  
16 scheme. While it is unlikely that a customer account number would be read in error if the  
17 hardware bar code check symbol scan validates, this additional check digit provides  
18 double assurance to the biller that the customer account number is correct. This is  
19 especially important from the biller's point of view when accepting bill payments from  
20 many sources of ACH submitted data, many of which may be human entered from the  
21 myriad of home banking software packages available - known empirically to have very  
22 high human input error rates.

1        To this point, it has been tacitly assumed that the biller will want to print this new  
2    bar code on the face of his bill remittance stub. However, technical, as well as political,  
3    reasons could preclude the printing of a new bar code standard on the face of the current  
4    bill remittance stub. An alternative option might be for the new bar code format to be  
5    printed on the back of the current bill remittance stub (so as not to disturb the current  
6    mode of visual remittance processing) or printed on a second or subsequent tear-off bill  
7    page, formatted for that specific purpose. A further alternative would be to utilize a  
8    specially printed bar code format enclosure page (printed on better and sturdier paper  
9    stock) that would permit multiple reuse by the customer. Spare space on that enclosure  
10   could even be sold for advertising to defray the printing costs by the biller.

11           The most common point-of-sale bar code used throughout the retail industry is the  
12    UPC-A variant. However, most scanners employ an internal firmware auto-recognition  
13    mechanism that permits them to detect and to read several bar code symbologies. The  
14    bar code symbology, under current consideration for the most general specification of an  
15    alphanumeric customer account number, is the Code 128 family. Where there are only  
16    numerics, the Code 128 Type C variant features a high-density bar code – one printed  
17    symbol per two digits of information. During the checkout aisle scanner process, the  
18    back-end host processor recognizes a bar code data scan line as a valid bill payment  
19    transaction and requires the cashier to enter an amount to be paid. When this amount is  
20    entered, a fixed transaction fee is added to the bill payment amount. On the printed  
21    customer receipt, the bill payment is recorded in a form similar to the following,  
22    including biller name and account number, amount paid, transaction ID, date and time,  
23    and transaction fee charged:

1 PMNT: Biller Name  
2 ACCT: Customer Account Number  
3 AMNT: \$ ddd.cc  
4 TRID: rrrrrr yjjj ssss  
5 DATE: mm/dd/yy hh:mm  
6 FEE: \$ dd.cc  
7

8 This time-stamped transaction data is then stored in the data communication

9 network interface unit for later transmission to the transaction collection system.

10 Where the checkout scanner detects multiple bar codes, the retailer cashier can be  
11 trained to recognize the placement of a valid bill payment "signature" bar code to be  
12 scanned for the proper processing of a customer payment. Scanning any other bar code,  
13 present on the bill remittance stub, that does not pass all of the bill payment "signature"  
14 tests results in an immediate validation reject by the data communication network  
15 interface unit.

16 Back-end Host Processor

17 The retailer back room host processor may be required to support two well-  
18 defined interfaces, the front-end checkout counter scanner system and the back-end data  
19 collection network interface. When the Code 128 bar code format is encountered from  
20 bill remittance stubs, it should be recognized as a customer bill payment, rather than the  
21 UPC code for a customer selected product. This decision can be performed in a number  
22 of ways by the back-end host processor. The easiest logic path to implement within the  
23 back-end host processor is as follows: if this bar code scan is not recognized as one of  
24 several defined pre-programmed sequences, pass it to the data collection network  
25 interface before rejecting the scanned data completely. The back-end host processor  
26 passes the complete scan line data to the data collection network interface unit for

1 secondary level validation and data translation. If secondary level validation is  
2 successful, the parsed translated data is passed back to the back-end host processor to  
3 complete the processing for this bill payment transaction. In this case, the returned  
4 translated data consists of the Biller Name, the Customer Account Number, and  
5 Transaction ID that is printed on the customer printed receipt.

6 As bill payment data is processed by the front-end checkout scanner system and  
7 completed, it may be relayed by the back-end host processor to the data collection  
8 network interface unit to be stored in non-volatile memory for later transmission to the  
9 central transaction collection system. There are a number of standard data collection  
10 network interface functions that may be accessed by the back-end host processor system,  
11 e.g. validating the biller name, adding a transaction, voiding a transaction, printing daily  
12 or weekly processed totals and reports, and setting or reading operational configuration  
13 parameters.

14 Data Collection Network Interface (DCNI) Unit

15 The retailer on-site data collection network interface unit should provide a well  
16 documented, protocol neutral features and functions front-end interface to the retailer  
17 back-end host processor. The DCNI should also provide a non-volatile memory storage  
18 capability of accumulated customer bill payment data. This may be accomplished with a  
19 solid state hardware design that is electrically isolated at all the critical interfaces and has  
20 no moving elements that mechanically wear and eventually cause the unit to fail. The  
21 back-end of the data collection network interface should provide a transparent interface to  
22 the central site transaction collection system and include functionality such as: (1)  
23 performing secure validation procedures with the transaction collection system; (2)

1 downloading DCNI unit operating system and program application code firmware; (3)  
2 downloading DCNI unit operational configuration parameters; (4) uploading DCNI unit  
3 memory image (emergency and debug use); (5) downloading Verification Biller ID and  
4 Name data; (6) uploading transaction data (compressed & encrypted); and (7) setting  
5 DCNI unit system date or time. The primary function of the data collection network  
6 interface unit is to provide a set of support functions to the retailer host processor to aid  
7 in the collection, validation and storage of transaction data from customer bill remittance  
8 stubs scanned at the checkout counter.

9 Figures 12 and 13 illustrate the mainline transaction information interchange  
10 between the checkout scanner, retailer host processor, and DCNI unit in processing a bar  
11 coded customer bill remittance stub, in one embodiment of the invention. As shown in  
12 Figure 12, the interaction occurring in the case of a valid account number begins with the  
13 bar code being read 1201 by the checkout scanner and passed to the retailer host  
14 processor. The host processor next validates the bar code 1202 and passes the resulting  
15 data to the DCNI. Since the account number is valid, an acknowledgment of validity  
16 (ACK) is returned 1203 via the host processor to the checkout scanner, along with the  
17 biller name and account number. The amount to be paid is queried 1204 at the checkout  
18 scanner, and the amount entered is passed 1205 to the retailer host processor, which  
19 passes 1206 the bar code data and the amount entered to the DCNI, where this transaction  
20 data is stored 1207. If the data store is successful, an acknowledgment is sent 1208 via  
21 the host processor to the checkout scanner, along with a transaction ID number. The  
22 checkout scanner may then print 1209 the biller name, account number, and transaction  
23 ID as a transaction receipt. As shown in Figure 13, in the case of an invalid account

1 number, the checkout scanner first reads the bar code 1301 and passes it to the retailer  
2 host processor. The host processor next validates the bar code 1302 and passes the  
3 resulting data to the DCNI. Since some aspect of the data passed to the DCNI is invalid,  
4 an acknowledgment of invalidity (NAK) is returned 1303 to the host processor with a  
5 reason code. The Reject Payment status, passed to the checkout scanner 1304 from the  
6 host processor, may or may not contain the DCNI reject reason code for human feedback.  
7 Reason codes might include, e.g., invalid scan line (not a valid bill payment “signature”  
8 scan line), Biller ID check digit error, invalid Biller ID (old biller that is not serviced  
9 anymore), or Biller Customer Account Number check digit error. Payment is  
10 consequently rejected at the checkout scanner 1304.

11 In one embodiment, the Transaction ID that is returned to the retailer back-end  
12 host processor, as a positive confirmation that the transaction data has been accepted and  
13 successfully stored, is a 15 digit number consisting of: DCNI unit identification (7 digits),  
14 last digit of year (1 digit), Julian date (3 digits), and transaction sequence number (4  
15 digits). This information may be printed on the customer receipt as three groups of digits  
16 (7,4,4) as an ease-of-use issue, should it be necessary for the consumer to dictate his  
17 Transaction ID to a customer service representative over the telephone.

18 Periodically throughout the day (primarily based on time and transaction volume  
19 thresholds), the DCNI unit should transmit its stored data to the transaction collection  
20 system after it has aged past the “transaction void” window. The “transaction void”  
21 window is defined as the time past which the transaction cannot be canceled after it is  
22 taken (e.g. 15 minutes to eliminate the possibility of fraud). In one embodiment, the data  
23 elements of each transaction transmitted to the host consist of the following: Retailer ID,

1      Biller ID, Biller Account Number, Amount Paid, Sequence Number, Transaction  
2      Date/Time Stamp, Status as Active or Void, and Operator ID. When these transactions  
3      are transmitted to the transaction collection system, they may be sent in batches whose  
4      batch name conforms to the following naming convention: DCNI unit identification (7  
5      digits), last digit of year (1 digit), Julian date (3 digits), and last transaction sequence  
6      number in batch (4 digits). Such a numbering convention makes it easier for customer  
7      service operations personnel to trace a given Transaction ID.

8              The design and implementation of the data communication network interface  
9      functions could optionally be performed as a real time on-line system or as a batch  
10     oriented system to the transaction collection system. If implemented as a real-time  
11     system, communication costs to the central site and a redundant “hot cutover” central site  
12     hardware configuration is very expensive, by comparison, to eliminate all single point  
13     equipment failures in an overall system operation. A central site batch oriented “hot  
14     backup” system eliminates the real-time aspect of transaction processing that  
15     exponentially escalates costs. Central site redundant hardware still has to be available,  
16     but much less of it is required to achieve the same level of system operation reliability.

17              In systems that are explicitly designed for real-time operation (e.g. credit card  
18     verification), “hot cutover” systems contain elements that have to be designed, a priori,  
19     into the combination of system and application software to anticipate and to detect the  
20     many types of potential system, application or equipment failures. When detected,  
21     transaction processing is immediately and automatically transferred to an operational  
22     system “in waiting”. In the ensuing recovery mode precipitated by this equipment switch  
23     over, transactions, in transit at the time of the first system failure, are either pushed

1 through to completion (if past a defined system bottleneck check point) or are pulled  
2 back. If a transaction is pulled back, all database record modifications are restored and  
3 then the transaction is reprocessed from ground zero.

4 “Hot backup” designed systems have fewer constraints. Spare equipment is  
5 powered up and ready to be switched into operational mode. While time is important, it  
6 is not as critical in this situation. In one embodiment, the DCNI unit resubmits  
7 transaction batches, not explicitly acknowledged as processed, at a later time (ranging  
8 from minutes to hours). Subsequently, if duplicate transactions are encountered on  
9 resubmission, they are not processed but are acknowledged as such to the DCNI unit.  
10 Much less premeditated contingency system software is required in this environment for  
11 robust system operation.

12 Transaction Collection System

13 While the data collection network interface may be a single unit, the central site  
14 transaction collection system may consist of multiple central processor server units acting  
15 in concert to perform a collective set of functions and processes. This design approach  
16 permits scaleable processing and avoids the possibility of single point failures that might  
17 curtail or impact the production processing of incoming transaction batches.

18 Figure 14 illustrates one possible configuration for the transaction collection  
19 system 1400. In the embodiment shown, incoming encrypted data files from the field  
20 data collection network interface units would come through a dial-up network or modem  
21 bank 1401 over a T1 or similar connection 1402 into an entry router 1403 outside the  
22 central site firewall, via a channel service unit/data service unit 1404 (CSU/DSU) or other  
23 similar device for providing isolation between the network and the on-premises

1 equipment. Parallel firewall machines 1405, one operating in “hot back up” mode, filter  
2 the inbound data traffic from validated and secure data sources. In addition to their  
3 primary security role, one of the ancillary functions of the firewalls 1405 is to load  
4 balance the data traffic across all available file transfer protocol (FTP) engines 1407. A  
5 plurality of FTP engines 1407 are shown in the diagram as being in a scaleable multi-  
6 server configuration, coupled via one or more integration hubs (e.g. 100 MB or 1 GB  
7 Ethernet hubs) 1425. The FTP engines 1407 provide the raw computing power to  
8 transfer data packets from the firewalls 1405, to coalesce the data packets into data files  
9 and to write them to the FTP storage server 1408, which may comprise RAID (redundant  
10 array of inexpensive disk) storage or similar mass storage.

11 In the FTP storage machine 1408, a monitor process scans for completed inbound  
12 files to process. Upon finding such a file, the file decryption keys are fetched from the  
13 central transaction collection server 1410 and the file name is packaged in a message  
14 packet that is sent to one of a plurality of transaction processor (TP) engines 1409 in a  
15 scaleable multi-server configuration, coupled via one or more integration hubs 1425. It is  
16 noted that the transaction processor engines 1409 and FTP engines 1407 may optionally  
17 be provided with a console switching unit 1460 for sharing a single console (e.g. monitor,  
18 mouse, keyboard) across the plurality of engines 1407, 1409. A transaction processor  
19 engine 1409 (TPE), upon receiving this message packet, then has sufficient information  
20 available to locate, to decompress and to decrypt the inbound data file into its component  
21 data record types. The various received data record types are stored in a database (e.g.  
22 Structured Query Language, or SQL) on the transaction collection server 1410. The  
23 transaction collection server 1410 database is configured across several partitioned sets of

1 physical hardware 1411 set up for RAID storage operation. The primary purpose for  
2 spreading the databases over several pieces of physical and logical hardware and/or  
3 software is to avoid having single points of data congestion and equipment failure. The  
4 transaction collection server 1410 database is the destination for all the data collected at  
5 all the retail processing locations. On a scheduled production basis, the data is  
6 aggregated and sorted, according to the biller identification associated with each  
7 transaction customer account number. ACH transaction files are prepared and formatted  
8 by biller identification, which then maps into biller-designated destination ABA bank  
9 routing and bank account numbers.

10 The administrative/data reporting server 1420 provides access to a copy of the  
11 production data for back office operations and monitoring by one or more work stations  
12 1427, without burdening the front end collection system. In the embodiment shown, the  
13 "glue" that holds the whole network together is one or more 100 MB or 1 GB Ethernet  
14 hubs 1425. This technology provides the foundation cornerstone by which various  
15 elements of the network communicate with each other and access each other's mass  
16 storage as local devices. The web/fax server 1430 provides on-demand reports to  
17 retailers through a web server application. It also provides periodic reports to retailers  
18 that can be faxed out through the normal public telephone network 1445. The electronic  
19 transmission interface (ETI) machine 1440 prepares the data that has been accumulated  
20 and processed by the transaction collection server 1410 for transmission to the Federal  
21 Reserve ACH Network. It formats the data into the correct ACH CIE (customer initiated  
22 entry) format and transmits this data file to the appropriate destination bank interface. An

1       optical drive 1432, tape storage unit 1433, or other such storage means may be provided  
2       for creating removable backups, which may be stored off-site.

3           In the CIE Entry Detail Record format, the following exemplary fields are  
4       populated with bill payment information: AMOUNT (Field 6) is populated with the  
5       Customer Payment; INDIVIDUAL NAME (Field 7) is populated with the Transaction  
6       Sequence Number (which contains the Julian date of payment); INDIVIDUAL  
7       IDENTIFICATION NUMBER (Field 8) is populated with the Biller Customer Account  
8       Number; and DISCRETIONARY DATA (Field 9) is populated with the Payment  
9       Complete Time encoded as a two digit time field ranging from 00 to 95. This number  
10      may be divided by 4 to calculate military hours (decimal) to the nearest quarter hour. For  
11      example, the number 26 divided by 4 would yield 6.5 (0630 or 6:30 AM). The remaining  
12      fields in the CIE Record format are populated with mandatory banking information data,  
13      such as biller ABA and account number.

14           A print control station 1470 is coupled to one or more print engines 1471 for  
15      handling printer transmissions to one or more laser printers 1472 for a variety of report  
16      and other printing functions.

17           Figure 15 illustrates an exemplary transaction processor executive controller (TPEC)  
18      display screen 1500, in one embodiment of the invention. The TPEC monitor program  
19      resides in the FTP storage server 1408 and is responsible for detecting complete inbound  
20      data files from the field retailer based data communication network interface units. When  
21      an inbound data file is detected, TPEC fetches the file decryption key from a master  
22      database and then dispatches it and the data file name to one of the transaction processor  
23      engine (TPE) 1409 program threads. The TPE 1409 decompresses and decrypts the

1 inbound data file and stores the component plain text data records in the SQL database  
2 that resides within the transaction collection server 1410 on RAID storage 1411. As  
3 shown, display screen 1500 may include features such as jobs attempted 1501 (i.e.  
4 batches received) and transactions processed 1502 (i.e. individual data records processed  
5 from the batches received). This display 1500 shows the current Transaction Process  
6 Engine(s) batch job statistics for the system batch dated 10/12/2000 at 13:44:31. As  
7 shown, TPEC is in PAUSED State – it is not currently dispatching any detected inbound  
8 data files to the TPE engines 1409. For this batch, 129 inbound data files were processed  
9 that resulted in 244 data records, stored in the SQL database.

10 Figure 16 illustrates an exemplary system monitor station (SMS) display screen  
11 1600, in one embodiment of the invention. This display 1600 shows that individual  
12 retailers may be configured in a directory tree-like structure, with each of a plurality of  
13 distributors 1601 being a parent to one or more retailer bill pay sites 1602. The directory  
14 framework of retailers 1602 may conform to any convenient form of administrative  
15 structure, e.g. a distributor model, based on a hierarchy of people, or a physical model,  
16 based on territories with defined boundaries (states, counties, or towns). Also illustrated  
17 in this display is the placement of INSTRUCTION files 1603 that can reside at any level  
18 within an arbitrary configuration structure. An INSTRUCTION file 1603 contains  
19 operational directives to be applied to retailer terminals at or below the level of placement  
20 in the directory structure (i.e. transaction pricing, unit transmission schedule, revised  
21 configuration parameters).

22 Figure 17 illustrates an exemplary end of batch monitor (EBM) display screen  
23 1700, in one embodiment of the invention. When the current system batch is closed out,

1 this display 1700 shows the status of the various data processing phases (e.g. system  
2 batch 1701) that take place when the collection of received transaction data batches from  
3 the retail data communication network interface units are consolidated and sorted by  
4 biller for electronic transmission. EBM may be a Visual Basic program that orchestrates  
5 the series of Structured Query Language (SQL) scripts and ancillary programs to perform  
6 transaction consolidation, general system batch reporting, database trimming and data  
7 archiving.

8 Figure 18 illustrates an exemplary electronic transmission interface (ETI) display  
9 screen 1800, in one embodiment of the invention. This display 1800 includes a summary  
10 1801 of the dollar amounts sent to each of the electronically connected remittance  
11 partners. The batch status window 1802 shows the current status of the transmission  
12 batches (QUEUED, ACTIVE, DELETED, or COMPLETED). An additional column  
13 (not shown) may be included to show the confirmed time of transmission completion.

14 Figure 19 illustrates an exemplary ETI transaction detail display screen 1900, in  
15 one embodiment of the invention. For a specific partner (in the example shown,  
16 MasterCard RPS), this display shows the details for each remitted transaction – biller  
17 name 1901, originating source transaction detail for direct traceability 1902, customer  
18 account number 1903 and amount paid 1904. From an electronic perspective, the biller is  
19 only interested in the payment amounts to be applied to various customer account  
20 numbers.

21 Figure 20 illustrates an exemplary ETI map biller-to-partner display screen 2000,  
22 in one embodiment of the invention. For each biller defined in the system, there is a one-  
23 to-one mapping of electronic destinations. While ninety-five percent or more billers may

1 have their remittances delivered via the Federal Reserve ACH network, the remainder of  
2 the remittances may be delivered by a combination of directly connected links and  
3 secondary consolidator links. Display screen 2000 shows, for each biller, a Biller ID  
4 2001 and Biller Name 2002 mapped to a particular electronic destination 2003. Not  
5 explicitly demonstrated by this display is the implicit dynamic mapping of internal Biller  
6 IDs 2001 to external Merchant IDs (depending on the electronic link utilized) that has to  
7 take place for this system to interoperate successfully with a variety of external electronic  
8 networks. Different electronic links may also have different data formats, as those skilled  
9 in the art will appreciate.

10 Figure 21 illustrates an exemplary transaction browser display screen 2100, in one  
11 embodiment of the invention. For every transaction processed through the collection  
12 system, the transaction browser program accesses and displays all the relevant  
13 information pertaining to that transaction, either locally or through a secure Web Server  
14 Application access to remote billers. Such information may include, e.g., a selection  
15 entry portion 2101, check and trail record 2102, and payment record 2103. (It should be  
16 noted that the bill image would typically not be transmitted to the transaction collection  
17 system, and that it is shown in this figure for illustrative purposes only.) The system  
18 derives the biller account number from the proposed standard format of biller imprinted  
19 bar codes, as described herein.

20 In summary, the primary function of the central site transaction collection system  
21 1400 is to collect transaction data from the retail network, sort and aggregate the data by  
22 biller, and to remit the customer payment data and the money to the biller by the Federal  
23 Reserve ACH Network. In the same way that customer data is collected, processed and

1 credited to individual billers, the ACH Network is used to electronically debit the  
2 retailers for the payments that they have collected from their customers. The transaction  
3 fee, paid by the customer, may be shared by the retailer and the transaction processor.

4 Central Biller Registry System

5 The current state of the bill payment industry is very fragmented, and many billers  
6 currently print their own customer invoices to suit the needs of their own remittance  
7 processing systems. There is no universal invoice printing standard to which everyone  
8 adheres because there is no economic motivation to do so. Several primary items are  
9 required for a bar coded customer bill payment system to succeed: (1) an industry  
10 standard that is relatively simple to implement with little or no marginal cost; and (2) a  
11 sufficiently large network of retail establishments, induced by the economic incentives of  
12 taking bill payments with little or no marginal cost; and (3) a method of delivering totally  
13 error-free, electronically remitted customer payment data and funds to billers at no  
14 charge.

15 From a business point of view, there are several organizations that, once  
16 persuaded, might provide the required motivation momentum in each of these areas.

17 With this assumption in hand, a central registry system would be required to collect  
18 information and to assign the bar code biller identification numbers, in the same manner  
19 that Network Solutions assigns domestic Internet addresses for the World Wide Web or  
20 the Uniform Code Council assigns UPC codes for the retail industry.

21 In one embodiment, assigned biller bar code identification numbers may be 7  
22 digits in length. The first 6 digits identify the biller (in a maximum population of 1  
23 million) with the 7<sup>th</sup> digit being the check digit. For every biller bar code identification

1 assigned, the following information might be required for central collection: (1) Biller  
2 Name, Address, Phone Number, Fax Number; (2) Biller Administrative Contact Name,  
3 Phone Number, E-Mail Address; (3) Biller Remittance Contact Name, Phone Number,  
4 E-Mail Address; (4) Electronic Connection Type (ACH or Direct); (5) Bank Name,  
5 Address, Remit Account Information, Type; (6) Bank Contact Name, Phone Number, E-  
6 Mail Address; (7) Account Number Information – detailed account format specifications.

7 Having collected the foregoing information, a biller bar code identification number  
8 would be assigned and a set of bar code print specifications sent to the biller contact. It  
9 would then be the responsibility of the biller to print and to remit a set of test bill  
10 remittance stubs for conformance testing and validation. Conformance testing on the set  
11 of sample bill remittance stubs would ensure that the bar code image quality and  
12 physical bar code dimensions satisfied the lowest common denominator bar code  
13 scanners at retail. Validation testing would ensure that information, supplied by the  
14 biller, regarding the printed bar coded customer account number conformed to published  
15 account number validation specifications.

16 Payment Time Stamp via Federal Reserve ACH Network

17 The INDIVIDUAL NAME field (Field 7) in the ACH CIE Batch Detail Record  
18 contains the customer payment transaction number, which is composed of the following 4  
19 data fields: DCNI unit identification (7 digits), last digit of year (1 digit), Julian Date (3  
20 digits), and the transaction sequence number (4 digits). While the DCNI unit number  
21 identifies the retailer where the customer payment was taken, the next four digits specify  
22 the year and the Julian date of payment submission and completion. The  
23 DISCRETIONARY DATA (Field 9) in the ACH CIE Batch Detail Record may be

1 populated with the Payment Complete Time encoded as a two digit time field ranging  
2 from 00 to 95. As stated above, this number may be divided by 4 to calculate military  
3 hours (decimal) to the nearest quarter hour. For example, the number 26 divided by 4  
4 would yield 6.5 (0630 or 6:30 AM). Time synchronization may be acquired from  
5 universal time standards available through the Internet or national dial-up time services  
6 (U.S. Naval Observatory, Washington, DC or the National Institute of Standards and  
7 Technology, Boulder, CO).

8           Whether or not sanctioned by a governmental agency, such as the U.S. Post  
9 Office, this time stamp could be recognized in much the same way that the U.S. Post  
10 Office postmark on letters is used to prove on-time submission. The customer would  
11 have printed proof of payment date and time, by virtue of his store receipt, that a biller  
12 could not artificially manipulate for purposes of assessing penalty payments. The biller  
13 would also have electronic access to this field as well. Currently, the biller has no  
14 automated means by which to read the U.S. Post Office postmark for proof of on-time  
15 bill payment submission (nor is there any incentive to do so). Bill payment "due date" as  
16 specified in the small print of every credit contract can have a variety of individual  
17 definitions, none of which is directly visible to or traceable later by the customer. A  
18 universal bill payment time stamp would eliminate all the variability of these "due date"  
19 definitions if the biller recognized this time stamp as the creditor date of receipt as  
20 specified in the Federal Reserve Regulation Z Section 226.10.

21           The advantage of this date stamping mechanism to the customer is that it would  
22 give him marginally more time to remit his bill payment on time to the biller. In the  
23 extreme, the customer could pay his bill payment at a late-hours store at one minute to

1       midnight on the due date. The customer would no longer have to worry about remittance  
2       delivery times. The advantage of this date stamping mechanism to the biller is that  
3       extremely late payments may be electronically credited to the biller no later than 36 hours  
4       after customer payment. In the majority of cases in which the biller had multiple daily  
5       data feeds from his bank, the credit would probably issue in fewer than 24 hours.

6       Electronically delivered and electronically applied, the current level of biller effort in the  
7       handling of late payments would be entirely eliminated with this system in place. In the  
8       extreme case, billers could safely invoke 48-hour cut-off notices with little or no error of  
9       service call recalls.

10       Electronically remitting data and money through the Federal Reserve ACH  
11       Network only works for those billers whose customer account numbers are less than or  
12       equal to 22 digits which is the current maximum width of Field 8, INDIVIDUAL  
13       IDENTIFICATION NUMBER, using the standard CIE Entry Detail Record format. If a  
14       remitted customer account number is longer than 22 characters, then either one of two  
15       possible solutions is available: using Field 3, 80 columns of data in the CIE Addenda  
16       Record format; or implementing a dedicated data link to the biller with a biller specific  
17       data format.

18       Alternative Electronic Networks to Accommodate Special Billers

19       For high volume billers preferring to have their data delivered to them faster than  
20       the current Federal Reserve ACH Network delivery schedule, direct file transfer links  
21       (e.g. FTP) from the ETI machine through the Internet may be made available. File data  
22       formats and the particular delivery mechanisms may be tailored to meet any biller  
23       requirement, so long as it expedites the flow of customer payment information. In this

1 mode of operation, biller data would be available for processing within minutes after the  
2 scheduled transaction collection system production “system roll” completes. The  
3 “system roll” sorts and aggregates biller data on a daily production schedule – once every  
4 12 hours. Payment totals for these transaction batches would be delivered via the ACH  
5 Network. For a trusted remitter, it is not necessary to directly couple the transaction  
6 dollars with the transaction data. The time lag between transaction data and transaction  
7 dollars via the Federal Reserve ACH Network should be no more than 24 hours.

## Improved Payment Embodiments

9 The embodiments described hereinabove relate, generally, to bar code based  
10 biller/payer systems for electronic bill payment. As described hereinabove, it is  
11 contemplated that, in an exemplary electronic bill payment infrastructure (e.g., see  
12 reference numeral 500 of Figure 5) consistent with the invention, consumers can pay their  
13 bills at supermarkets and large retail chain stores and receive immediate credit from  
14 billers for their payments. In such an infrastructure, the biller receives good payment  
15 funds, deposited directly into his bank account, and error-free electronic payment data for  
16 consumer bill payments by 6 AM the very next business day. Contractually, the biller  
17 backdates the received bill payments to the “electronic postmark” time and date paid at  
18 retail, regardless of the time that the payment data takes to post to the biller’s accounts  
19 receivable system. Compared to the present paper based remittance processes commonly  
20 employed throughout the payments industry today, such an infrastructure provides for an  
21 electronic process that remits error-free payment funds and data directly to billers within  
22 hours, rather than days.

1        As efficient as this electronic bill payment process may be, it may not be fast  
2    enough for the needs of Internet commerce based companies, selling products to  
3    electronically connected remote consumers. The electronic bill payment process, as  
4    described hereinabove with respect to billers and payors, still depends on the biller  
5    generating a paper bar coded invoice statement and sending it to the consumer by US  
6    Mail, a process that can take, on average, anywhere between 6-8 days. When the  
7    consumer has the financial resources in hand to pay his bill, he can then remit his  
8    payment directly to the biller, electronically, within hours.

9        In an improvement to the electronic infrastructure for this process, described in  
10   this section, Internet commerce-based companies can now choose a new bill payment  
11   method that is very simple and can reduce the time interval between biller invoice  
12   statement generation and consumer payment notification to the biller, to less an hour.

13       Another improvement to the electronic infrastructure for this process, described in  
14   this section, is the provision for person-to-person money transfers. Currently, there are  
15   several organizations that offer electronic person-to-person money transfers as long as the  
16   sending and receiving parties deposit and receive their remitted funds within the same  
17   organizational network of geographically dispersed branch offices. What may be a  
18   convenient remittance location for the sender may not be so for the receiver and/or vice-  
19   versa. Person-to-person money transfers can be easily accomplished with a bar coded  
20   deposit slip that permits a sender to remit funds directly into a receiver's bank account,  
21   and such funds are subsequently accessible for withdrawal at a nearby and convenient  
22   Automated Teller Machine (ATM) or for a debit card purchase. The details of these  
23   improvements are discussed hereinbelow:

## Improved Electronic Bill Payment Network

2 The embodiments described in this section relate to an improved national  
3 electronic bill payment network, wherein bar coded invoice statements are generated  
4 immediately by the biller or the consumer and remitted to the consumer in the span of  
5 seconds to minutes via facsimile, e-mail or other image transmission method. Upon  
6 receipt of such an imaged invoice statement, the consumer, with payment in hand, may  
7 go to a local store that accepts and processes these bill payments. When the consumer  
8 payment is processed at retail, it is electronically remitted to the biller with absolute  
9 accuracy within 24 hours after receipt of payment, and electronic notification to the biller  
10 may occur within minutes after receipt of payment, with no payment repudiation.

Such an electronic bill payment network offers the following benefits: The biller benefits by receiving 100 percent accurate electronic bill payment information and good funds, delivered into his bank account by 6 AM the very next business day that can be directly applied to his accounts receivable. The biller benefits by receiving an immediate electronic notification of consumer payment at retail with funds that cannot later be retracted. As a result, billers can then ship the consumer product sooner, thereby raising consumer satisfaction levels with their Internet portal. The consumer benefits by receiving an immediate electronically delivered bar coded invoice statement for his Internet shopping basket of products via facsimile, e-mail or other image transmission method. The consumer benefits because he can then pay his bar coded invoice statement locally with his choice of cash, check, debit card or any credit card for his Internet shopping basket without having to disclose any personal financial information to a remote Internet store. Further, local payment precludes the possibility of future fraud.

1 resulting from hackers' or others' unlawful access to any stored financial information left  
2 and residing at remote Internet stores. The local retail establishment benefits by  
3 receiving a relatively cost-free margin from each payment transaction taken. Finally, it is  
4 anticipated that a national enhanced network with many retail outlets will spur the  
5 demand for yet new immediate and electronically delivered financial products and  
6 services, using "signature" specific bar codes, and thus, may generally benefit the  
7 economy of the country or other geographic area in which it is implemented.

8 An exemplary embodiment of the improved bar coded bill payment based system  
9 consistent with the present invention utilizes a bar code on the biller invoice, which is  
10 delivered to the customer electronically, i.e., by fax, e-mail, or, other image transmission  
11 method, and payment information and payment credits are returned to the biller  
12 electronically. This system may augment some elements of the biller/payor network 500  
13 (described hereinabove with respect to Figure 5) with faster and parallel processing  
14 elements. In this case, the biller accounts receivable and US Mail consumer remittance  
15 mechanisms may be enhanced with a new accounts receivable invoice statement image  
16 generation mechanism that can be activated, on demand, either by a biller customer  
17 service representative or by a consumer initiated action. The result of either action is a  
18 bar coded invoice statement image that is electronically remitted to the consumer within a  
19 time frame of seconds to minutes. The transaction collection system described  
20 hereinabove, which already has an inherent user Internet accessible transaction browser  
21 capability, may be enhanced with e-mail, facsimile or other means of electronic  
22 notification to the biller when specifically designated payments have been received. An

1 automated caller response system may provide for consumer inquiry confirmation of  
2 payments.

3 Turning now to Figure 22, an exemplary improved electronic bill payment  
4 network 2200 is illustrated. For all the goods and services rendered to a consumer over a  
5 given traditional billing period (or interactive Internet shopping session), the biller  
6 accounts receivable 2202 may accumulate a dollar total and generate a detailed bar coded  
7 invoice statement image 2203 that can be electronically remitted to the consumer 2204.

8 This same process can also be used by a biller customer service representative 2201 to  
9 replicate a previous invoice statement that a consumer may have lost. For example, if a  
10 consumer wants an immediate replacement copy of the invoice for payment, the  
11 consumer can access a biller web site to generate a remittance or deposit document. The  
12 time for a consumer to request the electronic invoice statement 2203 may be as little as a  
13 few minutes after a request is made. The invoice 2203 is transmitted to the consumer  
14 2204, which transmission may be from a few seconds to several minutes, depending on  
15 factors such as the method of transmission, queue capacity, and number of open queue  
16 slots. The consumer 2204 receives the bar coded invoice statement image 2203.

17 To pay the bill, the consumer 2203 might go to a local store (or other location  
18 with appropriate hardware/software/network connection) that processes these bill  
19 payments. The time for this to occur is variable, depending upon the consumer's  
20 circumstances, and may occur in as little as a few minutes. The consumer 2203 presents  
21 his imaged bar coded invoice statement 2203 to the checkout cashier for scanning by the  
22 checkout scanner 2205, which may be done while other retail UPC coded items are being  
23 scanned. Instead of looking up an in-house UPC code for pricing, the scanner 2205

1 would pick up the bill payment bar code that identifies the biller to be paid and the  
2 account number to be credited. The consumer tells the checkout cashier the amount to be  
3 paid on that account and his option for requesting “normal” or “express” payment  
4 processing, and the cashier inputs the amount to be paid into a terminal (which may be  
5 integrated into a point-of-sale system) which is in communication with a backend host  
6 processing system 2206. The checkout of remaining products and items (or bills)  
7 continues until the complete total for all goods and services is calculated. Upon receiving  
8 payment from the consumer, that bill payment is then complete. The consumer may  
9 receive a printed receipt of the payment tendered with the date and time the payment was  
10 made. The in-store backend host processing system 2206 immediately completes and  
11 forwards all the payment data to the data collection network interface unit 2207, which  
12 may occur in a little as a few seconds.

13 The data collection network interface 2207 (DCNI) unit collects and stores all the  
14 consumer bill payment data in non-volatile memory. Periodically (e.g., throughout the  
15 day, and/or based on time and transaction volume thresholds), the DCNI 2207 transmits  
16 the bill payment data to the central site transaction collection system 2211, which is part  
17 of a central site computer system 2210 that may also include an Internet server/browser  
18 2212 and/or automatic caller response system 2213. Additional transmissions may be  
19 scheduled before the daily transaction collection system 2211 aggregation times. If a  
20 particular consumer payment is designated for “express” processing, it may immediately  
21 be transmitted to the central site computer system 2210 when the transaction void  
22 window expires for that payment. The time for the back-end and collection system  
23 processing has no impact on customer payment time, since all payments may be time-

1 stamped. Separately calculated calendar day payment counts and totals may also be sent  
2 to the transaction collection system 2211 as an independent transaction audit balancing  
3 mechanism.

4 The transaction collection system 2211 may continuously (and/or periodically)  
5 receive payment data information from a distributed network comprising a plurality of  
6 data collection network interface units 2207 deployed at field retail establishments.  
7 Before the last processing window closes at the Federal Reserve Automated Clearing  
8 House (ACH) Network 2214, all customer payments may be sorted and aggregated for  
9 direct remittance to their respective billers, which may take approximately an hour.

10 As the transaction collection system 2211 receives payment data information from  
11 the network of data collection network interface units 2207, it processes and stores each  
12 consumer bill payment into a database. Once stored in the database, that payment and  
13 ancillary information can be viewed with a local transaction browser or Internet web site  
14 display 2212. When "express" payments are encountered in the payment data stream,  
15 immediate electronic notification may be posted to the biller in one of several possible  
16 forms: e-mail, facsimile or biller specified custom electronic form. Accessible from that  
17 same database information, an automated caller response system 2213 can verbally  
18 confirm the receipt of a particular transaction, particularly for customers 2209 seeking  
19 "comfort call" confirmation regarding the status of a payment. For "normal" payments,  
20 the biller customer service toll-free number may be nominally printed on the consumer  
21 receipt. For "express" payments, the biller customer service toll-free number may be  
22 replaced with a special in-house toll-free number to relieve biller customer service

1 representatives 2208 of nervous consumer confirmation inquiry calls, typically for  
2 payments that are long overdue.

3 Processing and distribution of electronic payment data may be done using the  
4 Federal Reserve Automated Clearing House (ACH) Network 2214, which may take 6-9  
5 hours. At the biller's bank 2215, the electronic payment data may be received from the  
6 ACH Network 2214 and stripped and reformatted according to biller specified formats,  
7 which may take 4-6 hours. Finally, the biller's accounts receivable 2202 and/or customer  
8 service computer files may be updated. Depending on the "legacy factor" of the biller's  
9 computer processing systems, this process can range anywhere from 2-3 hours to 4-5  
10 days.

11 From both the biller's and consumer's perspective, the payment network/system  
12 2200 described in this section may be contrasted with the biller-payor network/system  
13 500 (described hereinabove with reference to Figures 5 et seq.), as follows:

14 From the biller perspective, both networks 500, 2200 may be capable of  
15 delivering good payment funds and data directly into the biller's bank account by 6 AM  
16 the next business day after the consumer pays his bill at retail. The improved network  
17 2200 may deliver electronic notification of consumer payment information to the biller  
18 within minutes after the payment is made at retail with the "express" delivery service.  
19 All payment funds collected can remain safe and secure within the Federal Reserve  
20 banking system network at all times. Moreover, the improved network 2200 can deliver  
21 a consumer invoice electronically and immediately, assuming the biller can generate and  
22 remit an electronic invoice statement image 2203 and the consumer has a corresponding  
23 device or means with which to receive the electronic biller invoice statement image (e-

1 mail, facsimile etc.). With this enhanced network 2200, the biller, having Internet access  
2 and using his choice of standard Internet browsers, can confirm a consumer's payment by  
3 querying the database of processed transactions in the transaction collection system 2211  
4 with a variety of database selection keys and criteria. Further, the biller can receive full  
5 payment funds for the amount stated on the bar coded invoice statement 2203. This point  
6 is especially important when it comes to paying various governmental and state license,  
7 permit and tax fees. By statute, many states and governmental organizations cannot  
8 accept the payment of license, permit and tax fees from consumers using either credit or  
9 debit cards because of the subsequent discounted payments remitted. Third-party  
10 payment surcharges, directly assessed from the consumer over and above the due  
11 payment amount, are generally acceptable. For example, the Commonwealth of  
12 Massachusetts has 307 different types of license, permit and tax fees that must be paid by  
13 consumers either by check or cash.

14 From the consumer perspective, the consumer can have a choice of local payment  
15 method (e.g., cash, check, debit card or any credit card), when paying a bar coded invoice  
16 statement 2203 at retail. The consumer does not have to divulge any personal financial  
17 information to a remote Internet storefront that electronically generates and delivers bar  
18 coded invoice statements directly to a consumer. With this enhanced network 2200, the  
19 consumer can subsequently confirm the electronic receipt of his processed payment at  
20 retail from an automatic caller response system 2213. Further, with this enhanced  
21 network 2200, the consumer, having Internet access and using his choice of standard  
22 Internet browsers, can confirm his own payment by querying the database of processed

1 transactions in the transaction collection system 2211 with a specific transaction  
2 identification number.

3 Presently for Internet commerce based companies, there is no mechanism  
4 available for conducting a purely "cash" sale over the Internet, where consumer cash and  
5 retail product can be exchanged in one anonymous atomic transaction. Currently,  
6 problems abound with all other forms of present payment methods, as follows:

7 Payment method fees always erode the profit margin of any retail or Internet  
8 storefront. Credit and debit card companies charge retail merchants varying  
9 commissions, based on a variety of factors that can range upwards from 2% of the  
10 purchase price. By law, these merchants cannot charge consumers different prices for the  
11 same retail product whether paid for with cash or by credit. Check guarantee companies  
12 impose processing charges on every consumer check passed through their service. Third  
13 party "e-wallet" payment type companies also charge for their value-added services as  
14 well. Therefore, the merchant absorbs these various discounts from his profit margin as a  
15 normal "cost of doing business". Checks, if exchanged, take time to clear and can be  
16 "stop paid" at the whim of the consumer. No one is exposed in this situation if the seller  
17 chooses to wait out the prescribed check clearing time (on average, approximately 4-5  
18 days); however, ultimate consumer satisfaction will be impacted by this delay. Credit  
19 card transactions require the consumer to divulge personal financial information to the  
20 remote Internet seller, which leaves open the potential for future and untraceable fraud.  
21 Then, that credit card transaction can be disputed and repudiated by the consumer, up to  
22 60 days later, leaving the seller with an uncollectable debt. While debit card transactions  
23 cannot be repudiated, they also require the consumer to divulge personal financial

1 information to the remote Internet seller, again, leaving open the potential for future and  
2 untraceable fraud. The consumer generally has no guaranteed recourse to recover any  
3 stolen funds debited from his account. Third party "e-wallet" payment type companies  
4 that require consumers to register their bank account numbers for secured transaction  
5 payments over the Internet are ripe for large-scale fraud. The consumer generally has no  
6 guaranteed recourse to recover any stolen funds debited from his E-Wallet.

7 The enhanced electronic bill payment network 2200 consistent with the present  
8 invention permits remote buyers and sellers to perform anonymous "cash" sale  
9 transactions, using the Federal Reserve banking system as the trusted escrow agent to  
10 safely and securely transfer funds between buyers and sellers.

11 An advantageous feature of this enhanced bill payment network, with a  
12 standardized bar coded bill payment "signature" featured as its centerpiece remittance  
13 mechanism, is that all the non-deterministic time delays have been removed from the  
14 total bill payment cycle. In legacy bill pay arrangements, the two largest delay factors  
15 are the biller invoice paper statement preparation, printing, mailing systems and the US  
16 Post Office mail delivery system. With the present invention, the consumer can now  
17 exercise a larger control function over his bill payment remittance process. The  
18 consumer can request an immediate invoice statement, which only requires minutes to  
19 formulate and to deliver electronically. The consumer has his choice of payment  
20 methods at a trusted local retail establishment and receives a printed bill payment receipt  
21 confirmation, guaranteed by the biller. The consumer payment method to the biller is  
22 completely anonymous, in terms of divulged personal financial information.  
23 Subsequently, the consumer, as well as the biller, can verify that the bill payment has

1 been received and processed at the central payment distribution site. Thereafter, payment  
2 funds and information may be electronically remitted to the biller within hours, by 6 AM  
3 the following business day directly into the biller's bank account.

4 It should be recognized by those skilled in the art that, although the foregoing  
5 description refers to a bar code transmitted by e-mail or by facsimile, other methods of  
6 transmission are possible and are included in the invention, e.g., facsimile transmission to  
7 or from a computer, facsimile machine, e-mail, file transfer protocol (FTP), hypertext  
8 markup language (HTML), extended markup language (XML), hypertext transport  
9 protocol (HTTP), modem, the Internet, a wide-area network (WAN), a local-area network  
10 (LAN), diskette, or other removable storage medium.

## Money Transfer Embodiments

12 In the above descriptions of an exemplary electronic bill payment network 500  
13 (described hereinabove with reference to Figures 5 et seq.), references have been made  
14 regarding the extensibility of this network and its internal structure to provide for new,  
15 cost-effective financial products and services. Domestic and international person-to-  
16 person money transfer services is one such product described here. (Of course, the  
17 money transfer technology described in this section may also have applicability to  
18 business-to-person, person-to-business, business-to-business, or other types of money  
19 transfers.)

20 The current forms of domestic and international money transfer services offered  
21 today are very labor intensive for both the person sending the money as well as the  
22 service provider. The amount of paperwork that has to be filled out by the sender and  
23 then manually transcribed into a “communication system” by the service provider has

1      been the ostensible justification to the customer of the high fee structure to provide this  
2      service. In point of fact, this service is extremely profitable, which is aptly demonstrated  
3      by the fact that there are so many large and small money transfer service providers in this  
4      industry, primarily serving immigrant communities whose members regularly send  
5      money to their home country families. Some service providers, such as Western Union,  
6      use relatively "high tech" electronic communication services to transfer funds while other  
7      small service providers use "low tech" courier services to physically transport funds to  
8      their intended destination.

9              Currently, there are several organizations that sell domestic or international  
10     electronic person-to-person money transfers as long as the sending and receiving parties  
11     deposit and pick up the remitted funds within the same organizational network of  
12     geographically dispersed branch offices. Fees for this service can range upwards from  
13     \$35 per transfer. However, convenient remittance locations for the local sender may not  
14     have corresponding convenient delivery locations for the remote receiver, or vice-versa.

15              In a system consistent with the present invention, domestic person-to-person  
16     money transfers can be easily accomplished with a bar coded deposit slip that permits a  
17     remote sender to remit funds directly into a receiver's bank checking account, providing  
18     funds that are subsequently accessible at a convenient local automated teller machine  
19     (ATM) or for a debit card purchase.

20              Future international (e.g., Mexican) person-to-person money transfers can be  
21     coordinated with appropriate financial organizations or banks that commonly distribute a  
22     form of debit card to their customer base. These organizations would distribute to their  
23     customer base plastic bar coded deposit-only cards keyed directly to their debit card,

1 which may then be sent to a remitter in another country (e.g., the United States). Using  
2 that bar coded plastic deposit-only card instead of a bar coded bank deposit slip would  
3 effect a deposit of the funds directly into the debit card account corresponding to the  
4 deposit-only card. In this way, domestic and international money transfers could cost far  
5 less than the fees charged today for this equivalent service.

6 The complete details of a bar coded bill payment "signature" are described  
7 hereinabove in the section entitled "Bar Coding Validation" with respect to Figures 10  
8 and 11, wherein a structure of successive data envelopes of embedded "signature" data  
9 fields are employed, consisting of a series of format designators, data and check digits.  
10 In the examples of Figures 10 and 11, which illustrate two arbitrary format designator  
11 values, the customer account number consisted of one numeric field whose associated  
12 check digit was the trailing digit of either a divulged format (= 3) or an unknown format  
13 (= 4) to which the biller appended a check digit according to a specified algorithm. In  
14 both cases, there is an independent mechanism in place to mathematically check the  
15 validity of the customer account number.

16 In the person-to-person electronic money transfer embodiment described in this  
17 section, the retail based electronic bill payment infrastructure is utilized, with the  
18 modification that the biller identification number is now used to identify the destination  
19 payment network instead of a destination biller organization. In the U.S. banking system,  
20 the standard bank account numbering scheme is based on a two-part number system  
21 consisting of an ABA (American Banking Association) number (8 digits plus a check  
22 digit), uniquely identifying the U.S. bank institution, and a local account numbering  
23 convention within that banking institution. While the format designator = 4 validation

1 template scheme can reliably be used to implement a generalized person-to-bank account  
2 remittance mechanism within the structure of the electronic bill payments infrastructure,  
3 the definition of a new format designator validation template would offer several  
4 advantages: An additional customer account number validation step further reduces data  
5 errors. Within the full customer specified account number, the ABA portion of the  
6 account number can be independently verified. The biller identification number would  
7 be reduced from 6 to 2 digits, in recognition of the fact that there are many fewer bank  
8 based or money transfer payment networks than billers. With a reduced number string,  
9 shorter bar code strings fit more appropriately on small banking deposit slips that  
10 measure, on average, 6" wide by 3" high.

11 Figure 23 illustrates an exemplary specification for the new format designator = 5  
12 format. As shown, the bar code 2300 comprises a 1-digit format designator value = 5; the  
13 number of components (2 fixed length (3,9), 1 variable length) by definition; 2-digit  
14 payment network identification number; 1 check digit of preceding 2 digits using 37  
15 weights, MOD10 algorithm; 8-digit ABA number (51066065); 1 check digit of preceding  
16 8 digits using 37137137 weights, MOD10 algorithm; entire customer bank account  
17 number (5106606550766936692) using 1212... weights, split MOD10 with added check  
18 digit to be discarded before presentation to the destination payment network (4); and  
19 calculated check digit of level 3 envelope using 2121... weights, split MOD10 algorithm  
20 (4).

21 As illustrated in Figure 24, this bar code 2401 appearing on a bank deposit slip  
22 2400 (or, alternatively, printed on a plastic or paper card, or printed on other media, e.g.,  
23 debit card, credit card, bank card, affinity card, card bearing a magnetic stripe,

1 identification card, smart card, or card bearing at least one name corresponding to an  
2 account number encoded in said bar code) could be presented at a retail checkout aisle,  
3 equipped for bill payment transactions, to initiate domestic person-to-person money  
4 transfers. By 6 AM the following business day, the money remitted the previous day  
5 may be available to the recipient to withdraw from a local ATM machine or to make  
6 payment from a debit card keyed or associated with that account. The ATM or debit card  
7 PIN (personal identification number) provides the same level of access security to the  
8 receiver of these person-to-person money transfers as exists for local funds that already  
9 reside in the account.

10 To implement an international (i.e., any-person-to-any-person electronic money  
11 transfer) using the retail based electronic bill payment infrastructure, the biller  
12 identification number may be used to uniquely identify the target destination payment  
13 network. In the case of a foreign payment network based on a system of debit card  
14 accounts, the format designator = 4 validation template scheme can reliably be used to  
15 implement and validate any generalized account numbering scheme to remit funds. A  
16 new format designator validation template definition offers extended customer account  
17 number verification advantages only if the destination payment network is willing to  
18 divulge its mathematical or other method of customer account numbering validation  
19 scheme.

20 In a hypothetical exemplary scenario consistent with the invention, a national  
21 chain of retail gas stations/convenience supermarket stores called GasoMax is located  
22 throughout the whole of Mexico, serving the public at large. GasoMax issues PIN  
23 protected debit cards to all their customers, in effect, setting up a pseudo-bank account

1 for each of them. Instead of carrying cash, these customers deposit or apply money to  
2 these accounts so that they can later purchase food staples or convenience items at the  
3 same time they come for fuel. When GasoMax issues these PIN-protected debit cards to  
4 their customer base, one or more bar coded deposit only cards are included (and/or a bar  
5 code might be printed on the debit card itself). The debit card can either be used to  
6 deposit local money into their account or to withdraw money in the form of purchases at  
7 the national chain GasoMax gas stations. Figure 25 illustrates an exemplary GasoMax  
8 debit card 2500, which resembles a standard debit card. Figure 26 illustrates an  
9 exemplary deposit-only card 2600 comprising a bar code 2601 consistent with the  
10 invention. In this exemplary scenario, the bar coded deposit-only card 2600 (or,  
11 alternatively, a bar code printed on the standard debit card) would be used in U.S. retail  
12 stores that offer access to the electronic bill payment network. Whereas most customers  
13 submit their U.S. based biller bar coded invoice statements to the cashier for payment, the  
14 customer that presents the GasoMax bar coded deposit-only card 2600 is making a  
15 payment to a destination payment network (Payment Network = 51, using a standard  
16 Format Designator = 4 description). Payments remitted to this payment network are  
17 automatically converted to local currency by GasoMax at a better rate than the larger  
18 commercial money transfer organizations. Commercial money transfer companies  
19 charge up to \$25 per \$300 remittance as a foreign exchange (FX) fee on top of the base  
20 \$35 remittance fee. In the recent past, wire transfer companies have been sanctioned for  
21 these usurious currency exchange practices. GasoMax would have a greater incentive to  
22 offer a better exchange rate to its customer base for its money transfer services than the  
23 current crop of commercial money transfer services. GasoMax could expand its local

1 customer base to shop for goods and services through its chain of gas station  
2 supermarkets that also offers a convenient money transfer service, as an affinity draw or  
3 loyalty program, for relatives working outside of the country to support their loved ones  
4 in Mexico.

5 Several further examples of “real-life” scenarios demonstrating the utility of an  
6 improved payment network consistent with the invention are provided, as follows:

7 Example 1: Payment for Mobile Telephone Service

8 A client procures a mobile phone subscription from a well-known national  
9 vendor. The client gives his place of employment as his cell phone billing address. As a  
10 new customer, he is assigned a total credit limit and an accrued monthly limit. When this  
11 client subsequently leaves his place of employment, he forgets about changing his mobile  
12 phone billing address and continues to use his mobile phone regularly, until one day his  
13 mobile phone stops working. When he calls the customer service office to inquire about  
14 the matter, he finds out that his mobile phone usage is well within his credit limits but  
15 that the reason for his mobile phone being disconnected is that bill payment is overdue by  
16 ten days. The company does not accept credit card payments and only accepts a check  
17 payment for the total past due amount. The company restores his service ten days after  
18 receiving and processing his check.

19 With an enhanced bill payment network consistent with the invention in place,  
20 this client could have remitted his late payment with the “express” payment service, as  
21 described hereinabove. The mobile phone company would have been electronically  
22 notified minutes after his retail payment, so that his cell phone service could be restored  
23 within an hour, rather than days.

### Example 2: Payment for Internet-Based Auction

2 The business model for the Internet-based auction (e.g., eBay) is very basic in  
3 concept, a meeting place for bringing together Internet buyers and sellers, wherein an  
4 electronic framework displays sellers' goods and services. When a sale is completed  
5 between a seller and a buyer, the online auction house charges a sales commission. It is  
6 the responsibility of the seller and the buyer to establish a lowest common denominator  
7 payment exchange method. Individuals selling items, are generally not equipped to  
8 process Mastercard or VISA credit or debit cards. If the seller accepts a personal check  
9 payment from the buyer, shipment of the sold item is delayed until the buyer check  
10 clears. A buyer can mitigate a seller shipment delay if he is willing to go out and  
11 purchase a money order to send to the seller. If the buyer and seller wish to use a third-  
12 party payment clearinghouse, (e.g., Billpoint or PayPal), then both must register personal  
13 financial information about their respective bank accounts to transfer money, as well as  
14 pay yet another sales commission charge. In general, none of these payment alternatives  
15 are particularly attractive if a buyer or seller desires any degree of financial  
16 confidentiality.

17 With an electronic payment network consistent with the invention in place, an  
18 online auction house could provide a cost-effective and value-added anonymous payment  
19 alternative within its framework of auction services. When a sale is completed, the  
20 online auction house provides the means for the buyer to print out a bar coded invoice  
21 statement, citing the online auction house as the biller of record with a transaction  
22 identification number. Instead of purchasing a money order, which would then have to  
23 be physically remitted, the buyer then pays this invoice at a local supermarket. When the

1 online auction house receives the electronic payment the very next business day, it  
2 notifies the seller of the completed payment via e-mail and then sends a check for that  
3 payment amount to the seller. Aside from exchanging their mailing addresses, both  
4 buyer and seller maintain their financial privacy.

5 This same sales paradigm would also work well for home shopping television  
6 channel environments, (e.g., Home Shopping Network, QVC), wherein the “express”  
7 payment option could be used when buyer desire is at its highest level.

8 Example 3: Automobile Insurance Payment

9 Insurance companies have varying grace periods within which to pay their  
10 insurance premiums, beyond which the policy is irrevocably canceled. If one cannot or  
11 chooses not to pay the entire annual premium on its anniversary date, an installment plan  
12 of smaller payments may alternatively be offered. If a premium payment is not received,  
13 a cancellation notice is sent toward the end of the payment grace period specifying a  
14 “hard” cancellation date. If a policy is canceled due to non-payment, depending on the  
15 prior payment history, the insurance carrier may not want to reissue another insurance  
16 policy because of a previous poor payment record. Therefore, given the gravity of the  
17 possible consequences, time is of the essence when it comes to paying insurance  
18 premiums on time – whether for car insurance, home insurance or personal life insurance.

19 Mailed late payments may not be delivered and processed in time. Depending on  
20 company policy, even in-person payments directly to insurance agents, during normal  
21 business hours, may or may not be acceptable. A confirmed electronic payment made  
22 using an enhanced bill payment network consistent with the invention would provide a

1 way for both the insurance company and insureds to know precisely when premiums are  
2 paid.

3 Example 4: Payment to College Student

4 When a parent agrees to send money for college expenses to a child away at  
5 school, a question that typically arises is, "how fast do you need the money?" A printed  
6 bar coded bill payment "signature" on out-of-town bank checking account deposit slips  
7 would enable remote deposits with a simple cash, check, debit card or any credit card  
8 payment at a local supermarket. A college-bound child could have previously sent home  
9 an ample supply of these deposit slips to cover for such eventualities. If a supply of  
10 originals is not available, a facsimile copy (sent at high resolution mode) will generally  
11 perform the job equally well. Funds deposited with this payment mechanism are  
12 electronically available the very next morning for withdrawal from a local ATM cash-  
13 dispensing machine. For a small fee (e.g., about a dollar), this service is much faster,  
14 more convenient to all parties involved and cost-effective than any existing person-to-  
15 person money transfer service.

16 Further Alternate Embodiments

17 The present invention may use the public Internet and Internet compatible HTTP  
18 and UDP protocols for the network interconnections described herein, as well as the  
19 Federal Reserve Automated Clearing House (ACH) Network or other networks. Those  
20 skilled in the art will recognize that the servers and their various components, as well as  
21 any other components described herein may be implemented in software, hardware, or a  
22 combination of both, and may be separate components or be integrated into other  
23 components described above. Likewise, the processes described herein may be separate

1 or combined and may run on common, shared, or separate machines, and as integrated or  
2 separate software modules.

3 Additionally, scanning bar codes, in methods consistent with the invention, may  
4 be performed using, e.g., wand or handheld scanning devices, scanning devices mounted  
5 to or near a point of sale system, and other such scanning devices, and such devices may  
6 be devices coupled to other devices, e.g., a computer, cash register, or point of sale  
7 system, or alternatively, integrated therein. A scanning device consistent with the  
8 invention may alternatively be coupled to or integrated into a PDA, handheld or pocket  
9 computer, as well as a mobile telephone or other portable, wireless, or computerized  
10 device. Thus, it is contemplated that an account corresponding to a mobile telephone or  
11 other such device, or other credit or debit account corresponding to the user of such a  
12 device, could be automatically debited for payment to a payee, in methods consistent  
13 with the invention.

14 It will be appreciated by those skilled in the art that, although the functional  
15 components of the above described embodiments of the system of the present invention  
16 are embodied as one or more distributed computer program processes, data structures,  
17 dictionaries or other stored data on one or more conventional general purpose computers  
18 (e.g. IBM-compatible, Apple Macintosh, and/or RISC microprocessor-based computers),  
19 mainframes, minicomputers, conventional telecommunications (e.g. modem, DSL,  
20 satellite and/or ISDN communications), memory storage means (e.g. RAM, ROM) and  
21 storage devices (e.g. computer-readable memory, disk array, direct access storage)  
22 networked together by conventional network hardware and software (e.g. LAN/WAN

1 network backbone systems and/or Internet), other types of computers and network  
2 resources may be used without departing from the present invention.

3 The invention as described herein may be embodied in one or more computers  
4 residing on one or more server systems, and input/output access to the invention may  
5 comprise appropriate hardware and software (e.g. personal and/or mainframe computers  
6 provisioned with Internet wide area network communications hardware and software (e.g.  
7 CQI-based, FTP, Netscape Navigator<sup>TM</sup> or Microsoft Internet Explorer<sup>TM</sup> HTML Internet  
8 browser software, and/or direct real-time TCP/IP interfaces accessing real-time TCP/IP  
9 sockets) for permitting human users to send and receive data, or to allow unattended  
10 execution of various operations of the invention, in real-time and/or batch-type  
11 transactions and/or at user-selectable intervals. Likewise, it is contemplated that the  
12 above-described servers consistent with the present invention may be remote Internet-  
13 based servers accessible through conventional communications channels (e.g.  
14 conventional telecommunications, broadband communications, wireless  
15 communications) using conventional browser software (e.g. Netscape Navigator<sup>TM</sup> or  
16 Microsoft Internet Explorer<sup>TM</sup>), and that the present invention should be appropriately  
17 adapted to include such communication functionality. Additionally, those skilled in the  
18 art will recognize that the various components of the system of the present invention can  
19 be remote from one another, and may further comprise appropriate communications  
20 hardware/software and/or LAN/WAN hardware and/or software to accomplish the  
21 functionality herein described. Alternatively, a system consistent with the present  
22 invention may operate completely within a single machine, e.g. a mainframe computer,  
23 and not as part of a network.

1       Moreover, each of the functional components of the present invention may be  
2       embodied as one or more distributed computer program processes running on one or  
3       more conventional general purpose computers networked together by conventional  
4       networking hardware and software. Each of these functional components may be  
5       embodied by running distributed computer program processes (e.g., generated using  
6       “full-scale” relational database engines such as IBM DB2<sup>TM</sup>, Microsoft SQL Server<sup>TM</sup>,  
7       Sybase SQL Server<sup>TM</sup>, or Oracle 8.0<sup>TM</sup> database managers, and/or a JDBC interface to  
8       link to such databases) on networked computer systems (e.g. comprising mainframe  
9       and/or symmetrically or massively parallel computing systems such as the IBM SB2<sup>TM</sup>  
10      or HP 9000<sup>TM</sup> computer systems) including appropriate mass storage, networking, and  
11      other hardware and software for permitting these functional components to achieve the  
12      stated function. These computer systems may be geographically distributed and  
13      connected together via appropriate wide- and local-area network hardware and software.

14       Primary elements of the invention may be server-based and may reside on  
15      hardware supporting an operating system such as Microsoft Windows NT/2000<sup>TM</sup> or  
16      UNIX. Clients may include computers with windowed or non-windowed operating  
17      systems, e.g., a PC that supports Apple Macintosh<sup>TM</sup>, Microsoft Windows  
18      95/98/NT/ME/2000<sup>TM</sup>, or MS-DOS<sup>TM</sup>, a UNIX Motif workstation platform, a Palm<sup>TM</sup>,  
19      Windows CE<sup>TM</sup> -based or other handheld computer, a network- or web-enabled mobile  
20      telephone or similar device, or any other computer capable of TCP/IP or other network-  
21      based interaction. The communications media described herein (generally referred to  
22      using the generic term “network”) may be a wired or wireless network, or a combination  
23      thereof.

1           Alternatively, the aforesaid functional components may be embodied by a  
2       plurality of separate computer processes (e.g. generated via dBase<sup>TM</sup>, Xbase<sup>TM</sup>, MS  
3       Access<sup>TM</sup> or other “flat file” type database management systems or products) running on  
4       IBM-type, Intel Pentium<sup>TM</sup> or RISC microprocessor-based personal computers  
5       networked together via conventional networking hardware and software and including  
6       such other additional conventional hardware and software as is necessary to permit these  
7       functional components to achieve the stated functionalities. In this alternative  
8       configuration, since such personal computers typically are unable to run full-scale  
9       relational database engines of the types presented above, a non-relational flat file “table”  
10      may be included in at least one of the networked personal computers to represent at least  
11      portions of data stored by a system consistent with the present invention. These personal  
12      computers may run, e.g., Unix, Microsoft Windows NT/2000<sup>TM</sup> or Windows  
13      95/98/ME<sup>TM</sup> operating system. The aforesaid functional components of a system  
14      consistent with the present invention may also comprise a combination of the above two  
15      configurations (e.g. by computer program processes running on a combination of  
16      personal computers, RISC systems, mainframes, symmetric or parallel computer systems,  
17      and/or other appropriate hardware and software, networked together via appropriate  
18      wide- and local-area network hardware and software).

19           As those in the art will recognize, possible embodiments of the invention may  
20      include one- or two-way data encryption and/or digital certification for data being input  
21      and output, to provide security to data during transfer. Further embodiments may  
22      comprise security means in the including one or more of the following: password or PIN  
23      number protection, use of a semiconductor, magnetic or other physical key device,

1 biometric methods (including fingerprint, nailbed, palm, iris, or retina scanning,  
2 handwriting analysis, handprint recognition, voice recognition, or facial imaging), or  
3 other security measures known in the art. Such security measures may be implemented  
4 in one or more processes of the invention.

5 Source code may be written in an object-oriented or non-object-oriented  
6 programming language using relational or flat-file databases and may include the use of  
7 other programming languages, e.g., C++, Java, HTML, Perl, UNIX shell scripting,  
8 assembly language, Fortran, Pascal, Visual Basic, and QuickBasic. It is noted that the  
9 screen displays illustrated herein at Figures 15-21 are provided by way of example only,  
10 and are not to be construed as limiting the invention or any component thereof to the  
11 exemplary embodiments illustrated therein.

12 Furthermore, it is contemplated that the system and method described herein may  
13 be implemented as part of a business method, wherein payment is received from users,  
14 which might include customers, retailers, and/or billers employing the invention. Such  
15 users may pay for the use of the invention based on the number of files, messages, bills,  
16 or other units of data sent or received or processed, based on bandwidth used, on a  
17 periodic (weekly, monthly, yearly) or per-use basis, or in a number of other ways  
18 consistent with the invention, as will be appreciated by those skilled in the art.

19 Those skilled in the art will recognize that the present invention may be  
20 implemented in hardware, software, or a combination of hardware and software. Finally,  
21 it should also be appreciated from the outset that one or more of the functional  
22 components may alternatively be constructed out of custom, dedicated electronic  
23 hardware and/or software, without departing from the present invention. Thus, the

1 present invention is intended to cover all such alternatives, modifications, and equivalents  
2 as may be included within the spirit and broad scope of the invention as defined only by  
3 the hereinafter appended claims.  
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